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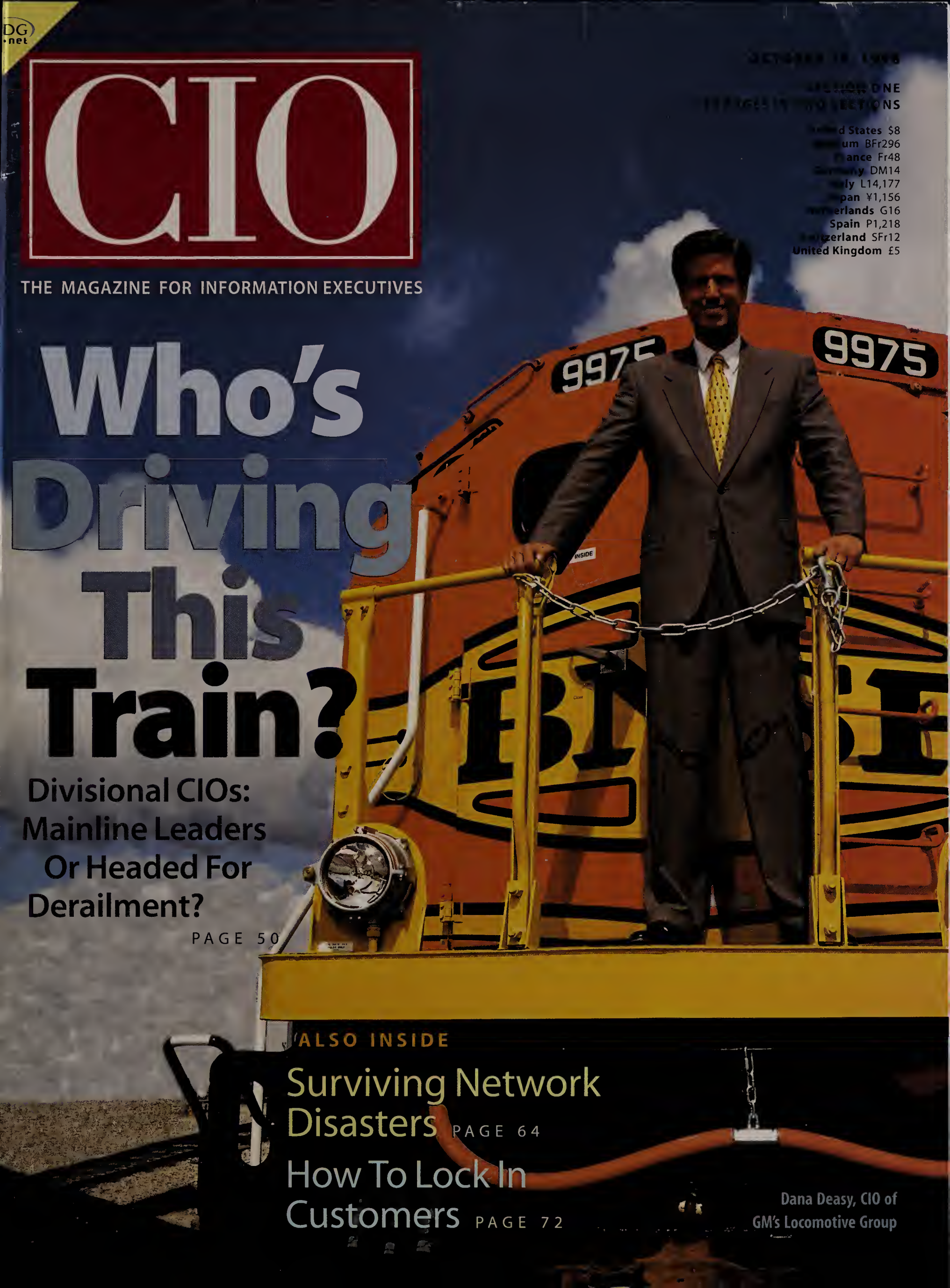
# CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

OCTOBER 15, 1998

SECTION ONE
[illegible] PAGES IN TWO SECTIONS

United States $8
Belgium BFr296
France Fr48
Germany DM14
Italy L14,177
Japan ¥1,156
Netherlands G16
Spain P1,218
Switzerland SFr12
United Kingdom £5




# Who's Driving This Train?

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Dana Deasy, CIO of GM's Locomotive Group

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CIO

VOL. 12 • NO. 2 • OCTOBER 15, 1998 • 194 PAGES IN 2 SECTIONS
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# Features

**40 Inclusionary Tactics**
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*By Lauren Gibbons Paul*

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COVER STORY: THE I.S. ORGANIZATION
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*By Lauren Gibbons Paul*

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NETWORK KNOWLEDGE A simulated network proves a perfect training ground to teach IS professionals how to respond to real-life crises. *By Tom Field*

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BOOK EXCERPT: INFORMATION RULES What you should know about customer loyalty and the competitive concept of lock-in. *By Carl Shapiro and Hal R. Varian*

ON THE COVER

As CIO of GM's locomotive division, Dana Deasy keeps IT on track.

*Cover photo by John Harquail*

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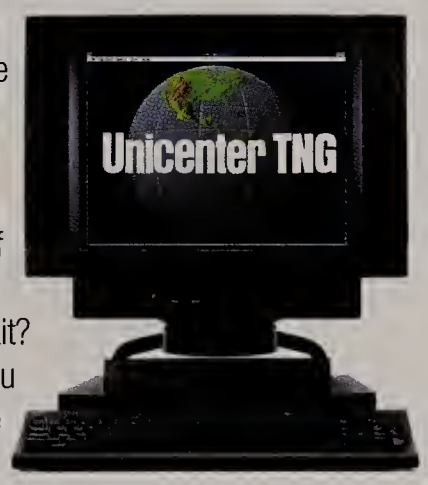


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**Is your network, or your company, the same as it was two years**

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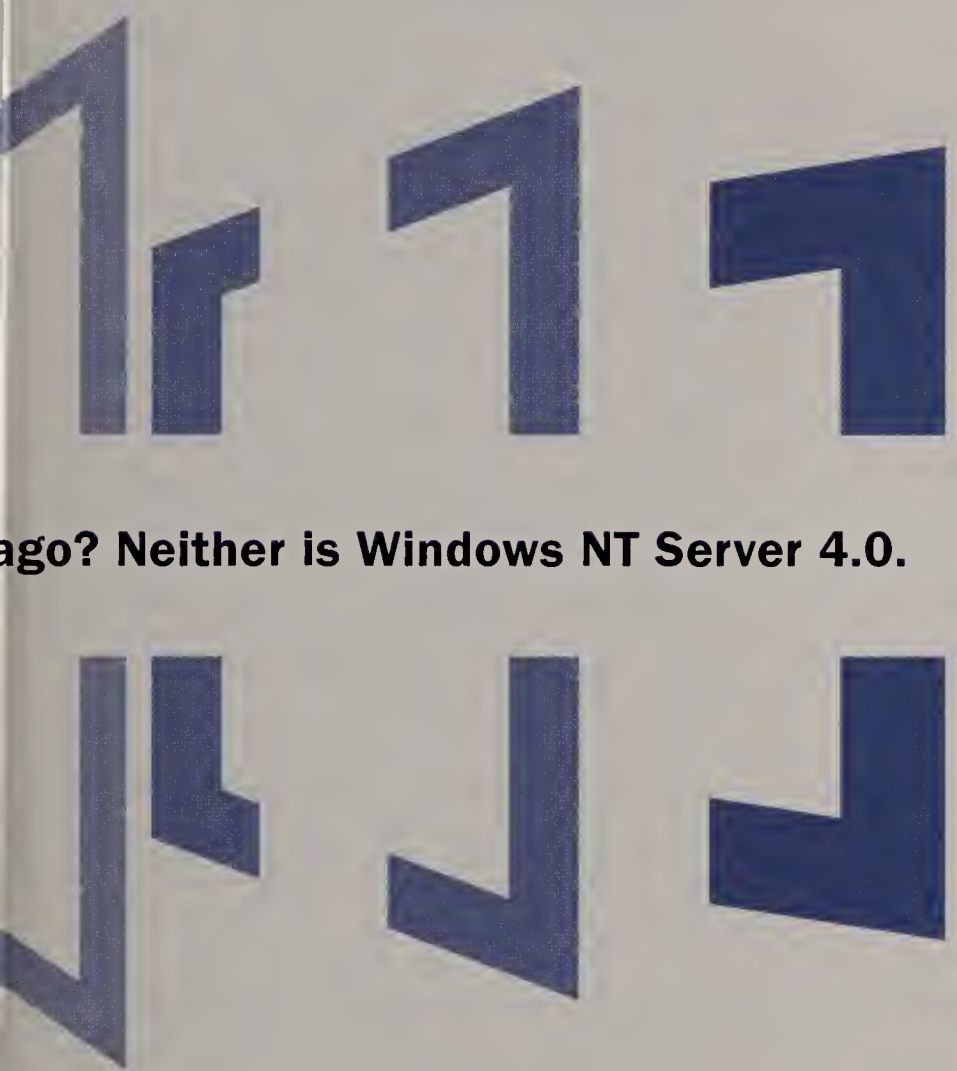

**ago? Neither is Windows NT Server 4.0.**

On July 29, 1996, we introduced Microsoft® Windows NT® Server 4.0. The idea behind this server operating system, as with 3.51, 3.5 and 3.1 before it, was that customers would benefit from an OS that runs their network and their business applications. It was about integration, and it still is. But a lot has changed in two years.

To keep up with the changing needs of customers, we've added hundreds of enhancements since 1996. In fact, today's Windows NT Server 4.0 is far different from the one we first shipped. For starters, we've improved file and print performance, and updated Web and application services. We've also enhanced networking and communications services, and enabled streaming media. And, we're committed to continued improvement as we work to provide a solid migration path to Windows NT Server 5.0.

So how have these improvements been received? In just two years, about 640,000 U.S. companies have installed over 1 million copies.

A lot has changed in two years. Including Windows NT Server 4.0.

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CIO

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WORKING SMART Since launching a new processing system in early 1997, Solutia has cut its expense reporting costs by almost half. *By Louise Fickel*


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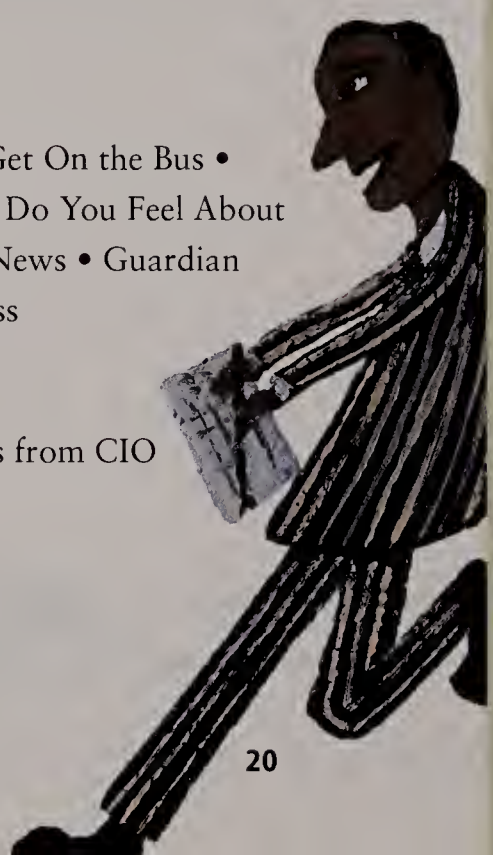

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**CONSULTING NIGHTMARES** Spending a bundle on smart, hard-working consultants won't guarantee you'll get what you paid for.

**MANAGING CONSULTANTS** Problematic IT projects yield lessons for best practices in working with consultants.

**CONSULTING TRENDS** The explosive growth of the IT consulting industry presents new opportunities and new challenges for companies.

**MANIPULATING CONSULTANTS** Create your own consultants on these pages!

**REALITY BYTES** Stop complaining about consultants and put a little more muscle into managing them.

**CHECKS & BALANCES** The way you choose to pay the piper may determine how happy you are with the tune.

**LEARNING CURVE** How do you pick the right type of consultant for the job?


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*Diplomat.*

*Strategist.*

*Efficiency Expert.*

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in dozens of cities
across every time zone, and
all of it supported by
my very busy IT staff.
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us to deliver the impossible –
and somehow, we always do.

# What I want.

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# In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

**Almost every organization's mission** statement or set of corporate values makes reference to three constituencies: customers, stockholders and employees. Unfortunately, a lot of the worthy intentions expressed in these documents, especially the ones that pertain to employees, never make it off the boardroom wall (unless it's to make it into a Dilbert comic strip).

Given the current staffing shortage, maybe it's time for managers to spend a little more time thinking about exactly what it is they're providing to their staff.

I'm not talking about signing bonuses or stock options or even training. I'm talking personal development and quality of life. Life is short, and we spend too much of it on the job not to use that time and context to increase our skills, expand our understanding, become better and stronger people, fulfill some small portion of our potential. I know I get that from my job—in fact, I get a lot of it from the most difficult and challenging parts of my job. I suspect many CIOs feel the same, else why would you take on such tough assignments? (See the October 1 editor's letter.) My question to you is, Are you doing enough to ensure that you're also providing those opportunities to the people who work for you?

Of course, it's not all up to you. Each individual on your staff has to set his or her own bar for personal accomplishment. But if you want to avoid Drew Carey's fate the time he instituted a no-firing policy, with employees suddenly freed of the fear of job loss running totally amok (Drew is like the TV version of Dilbert), you need to provide two basic things: the resources (and the freedom) for every individual to be his best and the inspiration to make every single person believe that it's a cool thing to shoot for so he will line up to make it happen.

The vast majority of people are smarter and more accomplished than they think. Unfortunately, most will also, without the right encouragement, settle for less than their personal best. If you could do only one thing to have a positive impact on your organization, you would do well to create an environment in which personal development is encouraged and applauded. Unless, of course, you think the Winfred-Louder department store is the kind of workplace upon which you want to model your own.

Abbie Lundberg
*lundberg@cio.com*

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CIO

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INTERNET INTEREST

I always enjoy reading *CIO*. The July 1 issue describing the Web sites of the second annual Internet and intranet winners [*CIO*, Section 2, July 1, 1998] was one of your most interesting issues. Normally, I read two or three articles. This time *CIO* kept my attention from the first page to the last. I visited many sites and do agree that they offer unique opportunities. Since I travel annually to Sweden, the Swedish Post Office immediately caught my eye. Through its Web site, it provides many services to the general public.

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OVERSITES

You missed what I consider the single most important Web site design issue ["Must-Haves," *CIO* Section 2, August 1, 1998]: Provide substance (information content) as your first priority over cosmetics (graphics).

If I go to a Web site that takes forever to load and find it doesn't have much content, that is the last time I visit that site. In fact, often there seems to be an inverse relationship between a site's content and its the graphics. Graphics can be overdone and too often are.

Time and money are spent dreaming up the most eye-catching graphics for sites that provide little in the way of useful information, and too often they are difficult to navigate. I want to go to a site quickly, find what I need quickly and move on. Time is money for most people!

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A MATTER OF TASTE

While I enjoyed Scott Kirsner's article ["Recipes for Alchemy," *CIO* Section 2, Sept. 1, 1998], I took exception to one sentence: "...shoppers who express an interest in Christian music won't be forced to browse through albums recorded by Satan-loving heavy metal groups."

While I'm sure Mr. Kirsner did not purposefully choose to show prejudice against heavy metal groups or the individuals who listen to heavy metal music, making a statement of this kind continues to enforce the idea that Satan equals heavy metal and heavy metal equals Satan.

Just as not all Christians are the same (some actually don't live very "Christian" lives), not all heavy metal groups or fans are Satan worshippers. In fact, most are not. Some Christians even like the genre. Generalizations are dangerously narrow-minded no matter where they turn up—whether they're racial, gender related or musically inclined.

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# Publisher's Note

**Managing an information** technology infrastructure is an ongoing process. CIOs constantly evaluate new technology as they discard the old. According to a recent *CIO* magazine survey, CIOs replace 30 percent of their PCs every 12 months. For operating systems, the process is longer.

Take a moment to think about the vendor meetings you have had in the past month. What was the message conveyed to you and your staff? I bet it was more than a bit weighted toward "replace, replace, replace."

Maybe that's why an "embrace and replace" speech I recently heard delivered by Masood Jabbar, the president of Sun Microsystems' computer systems division, hit a responsive chord with me. Successful vendors must first embrace a customer's current infrastructure before they can possibly hope to replace it with new goods and services in their product portfolios.

Too often, it seems, vendors and their channel partners make the strategic mistake of positioning their products as the salvation of the future, with little or no regard to the current infrastructure a CIO has in place. With business models often based on product life cycles of one year or less, vendors have to push new technology while the margins are high. But that does not necessarily mean you have to buy. And many of you are starting to convey this message loud and clear to the market.

Vendors, particularly those moving into the enterprise space for the first time, are starting to listen. I heard Eric Schmidt, the chairman and CEO of Novell, echo Jabbar's comments almost verbatim in announcing the shipment date for NetWare 5. Jabbar and Schmidt understand that in the world of the CIO, *legacy* is not a dirty word. Quite the opposite.

Put the word out through your staff and your vendor partners: Nothing gets replaced until you, the CIO, are satisfied that the due process of embracement has been completed.

Do you embrace this idea? Let me know. Drop me a note at the e-mail address listed below.

Gary J. Beach

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# Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

*Edited by Sara Shay*

## Not Your Ordinary Desk Job

**ERGONOMICS** It's a classic example of putting the cart before the horse. Office buildings that are meant to house high-tech companies often are designed without technology in mind, making it cumbersome to fit it in. But some forward-thinking companies are seeking to narrow the divide between technology and architecture.

Washington, D.C.-based architecture firm Greenwell Goetz Architects PC, for example, has learned that letting IS people in on the planning stages of building design or redesign pays off. "A good office environment entails understanding the structure of the company," says Lewis Goetz, CEO and principal of the firm who sees "future-proofing an office" as an emerging trend in architecture.

"Technology is one of the key components of how an office works, and it needs to be integrated as part of [a company's] strategic view." To encourage a synthesis between architecture and IT, Greenwell Goetz architects, who are specially trained in technology issues, work closely with IS departments early in the design process to determine a company's specific technology needs—recabling an existing office space to accommodate new technology, for example. "Spaces are being designed around an integrated approach. Having connectivity is giving companies much greater ability tech-

## Get On the Bus

**GLOBAL POSITIONING SYSTEMS** In our day, we used to trudge 10 miles through the snow uphill to get to school, but try telling that to the younger generation. They just don't understand. Thanks to the wonders of technology, kids today don't even have to wait outside for the bus, let alone brave the inclement weather.

Global Research Systems Inc. of Rome, Ga., now offers BusCall, a system that uses GPS satellite tracking and the telephone to notify parents when the school bus is approaching so that Junior can meet it as it arrives rather than risk catching cold at the bus stop. When the bus, which must be equipped with a GPS tracker, reaches a certain point on its route, the BusCall system at the local telephone company's office automatically dials the subscriber's home phone, cellular phone or pager. The phone either emits a distinctive ring or transmits an automated voice message that tells subscribers the bus is about to arrive (no special equipment is needed in the home). Subscribers choose how much advance warning they need.

The service is made available through local phone companies and is billed like other enhanced phone services such as call waiting. The telephone company sets the price of the service, which will probably be $4 to $6 per month, according to Gena Payne, Global Research's cofounder. There is no cost to bus companies or school systems.

BusCall debuted last winter in frigid Bemidji, Minn., and it should be available by the end of 1998 in Maine, Wyoming and Canada. The company plans to market similar services to the elderly, the handicapped and the public transportation industry, Payne says.

For more information, visit *www.buscall.com.* ■

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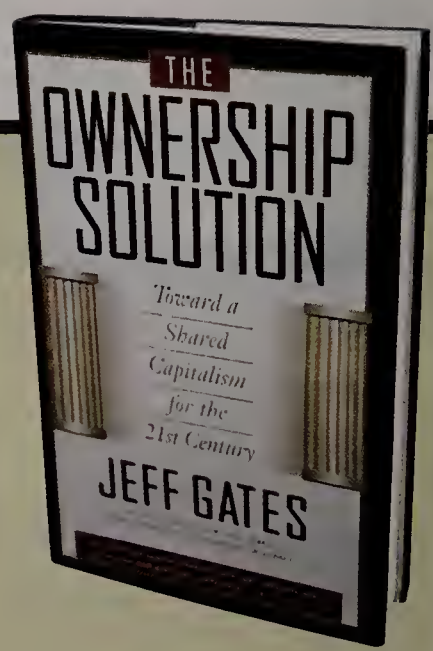
nically," says Goetz.

And once the office is built, how should a technologically minded company furnish it? The folks at Zeeland, Mich.-based furniture manufacturer Herman Miller Inc. have a couple of ideas aimed at what they call "knowledge athletes," or people who spend most of their working hours sitting in front of a computer (yes, by merely sitting, you can now call yourself an athlete). Herman Miller's Acrobat Suite, a computer workstation that allows a desk jockey to work while standing, sitting or lounging on the floor, encourages constant movement and offers help for circulation and respite for cramped backsides. It works like this: The suite's "interaction tower," which supports a monitor, keyboard and mouse, uses a weight and pulley system that allows a worker to adjust the workstation's height to anywhere from 9 to 48 inches with the touch of a finger and to secure the position with a lock and lever. An equipment cart holds CPUs and miscellaneous desk materials, and a height-adjustable table can be raised or lowered to accommodate the worker's position. You can place orders for the Acrobat Suite later this fall, and deliveries will begin by the end of this year. (At press time, pricing was not yet available.)

"We're trying to get away from the horizontal reference of a desk," says Jane Reardon, a senior product manager for Herman Miller. "[The Acrobat Suite] encourages people who should move around to move around." An added bonus: The whole contraption can be folded up and wheeled into another room for presentations. Maybe sometime in the future it will be OK for workers to take their work lying down.

*–Meg Mitchell*

**Off the Shelf**




# Making More Capitalists

**The Ownership Solution: Toward a Shared Capitalism for the 21st Century**

*By Jeff Gates*
*Addison-Wesley Publishing Co. Inc., 1998, $27.50*

AMERICAN MONEY HAS LOST what little conscience and humanity it ever had. For better or worse, the robber barons of capitalism, the Rockefellers and Mellons of the world, were at least hands-on managers of the companies they owned. And when their mortality became apparent, whether out of a sense of vanity or guilt, they created powerful charitable trusts that returned some of the millions they plundered from the masses.

Today the majority of American money, $11.1 trillion of it, is held not by people but by institutions—mutual funds, pension funds, insurance companies, banks and foundations. These institutions manage only one thing: money. In his new book, *The Ownership Solution*, Jeff Gates argues that this "disconnected" form of capitalism can lead only to a further concentration of wealth and hasten the already alarming disparity between the haves and the have-nots. These institutions make investment decisions based upon a narrow set of formulas that do not take into account the well-being of employees or communities. Worse, lacking egos, they eschew legacies. They exist only to produce increased returns on capital.

*The Ownership Solution* sloshes through economic, political and social theory and history—everybody from John Locke to Karl Marx to John Maynard Keynes is in here—and may bog down the reader who doesn't agree with Gates's basic premise: Capitalism is broken and needs to be fixed. But the book goes beyond polemic. Gates doesn't just tell us what's wrong with capitalism—he offers a plan for fixing it. His plan reflects his background as an advisor to former U.S. Senator Russell Long, who, as chairman of the ultra-powerful Senate Committee on Finance in the '70s, managed to sneak through legislation mandating the Employee Stock Ownership Plan, or ESOP.

Though ESOPs have had a mixed legacy, they are the best imperfect way to distribute ownership of companies and their assets to employees who have a direct stake in whether management is looking out for the long-term interests of the company as well as the community. Ironically, ESOPs are so widely supported by conservative Republicans and liberal Democrats alike that little has been done in Washington to advance the concept beyond the original legislation, says Gates. So he provides clear ways to encourage more distribution of ownership, such as tax breaks for ESOP companies or favoring them in awarding government contracts. Though this may smack of "corporate welfare," Gates argues that it is really smart investing. Research by the major investment houses has shown that such companies offer better long-term returns than others. For that reason, institutional investors like ESOPs. The remaining challenge, says Gates, is to get corporate America to embrace the concept and the public to push harder for ESOPs. *The Ownership Solution* offers a clear outline for that letter you've been meaning to write to your congressman. *–Christopher Koch*

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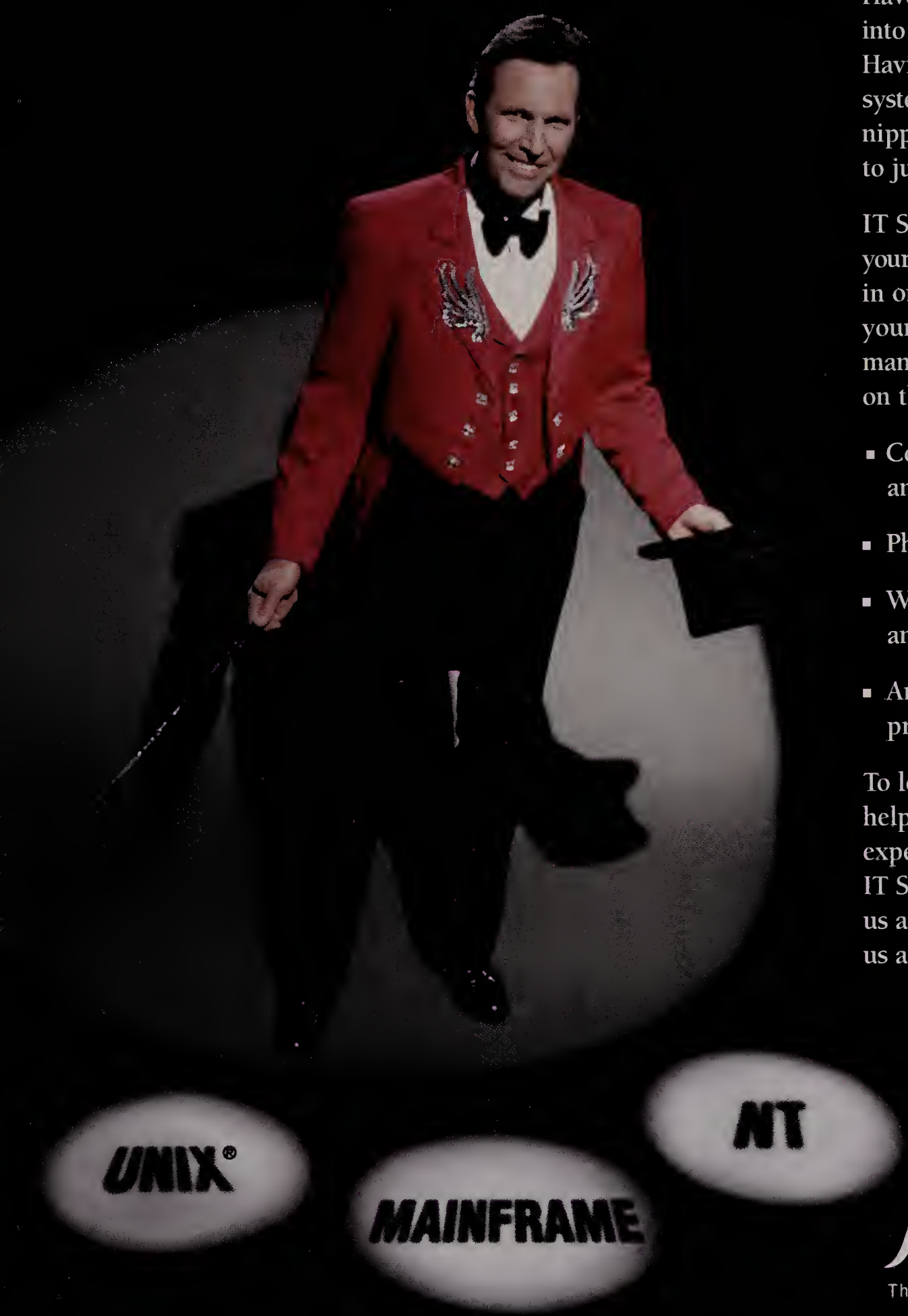


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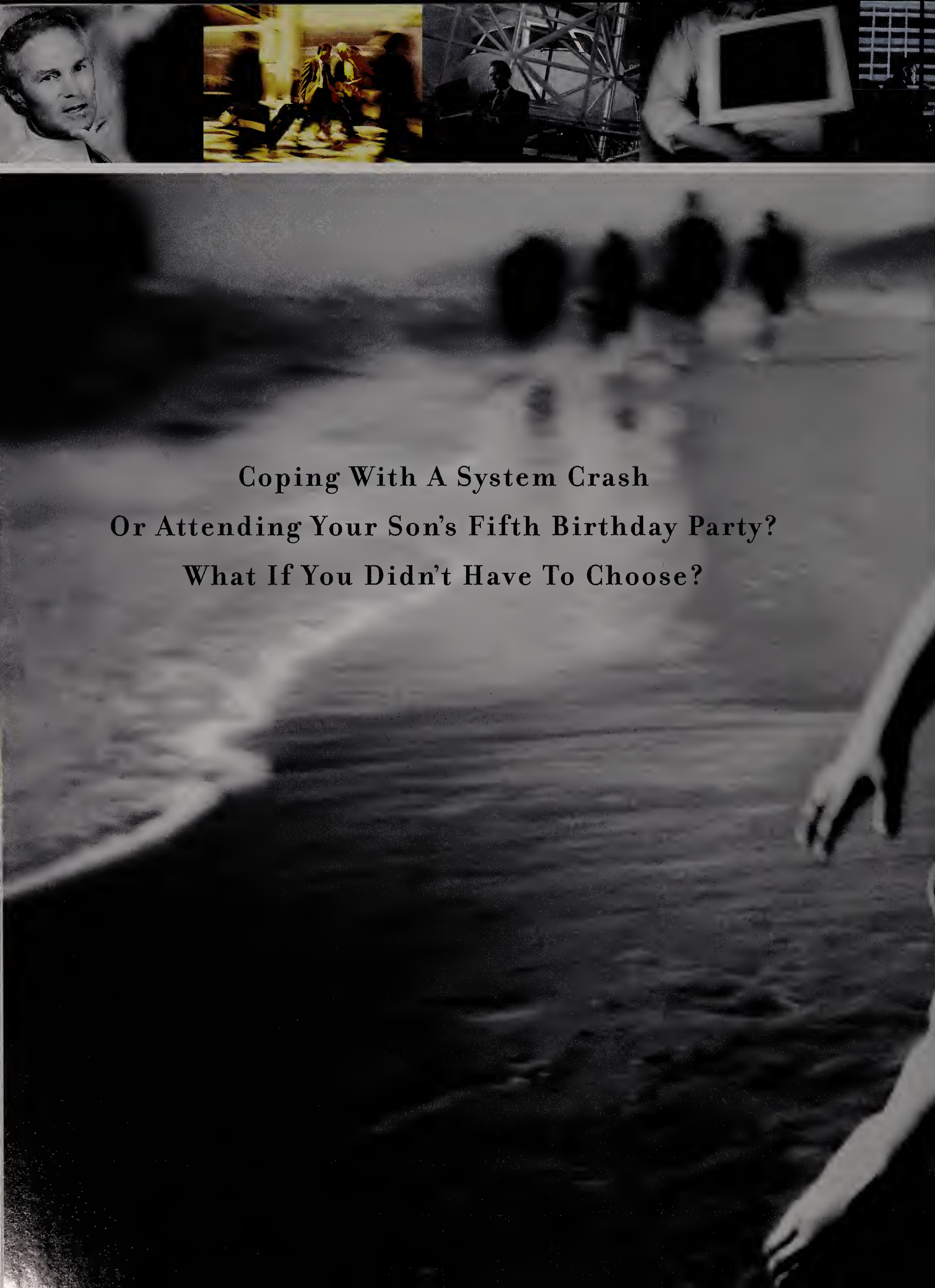

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# Trendlines

## How Do You Feel About Y2K? Yes, Go On...

**COUNSELING** First it was the consultants, then the lawyers, and now even the shrinks are trying to make a buck off the millennium bug. Karen Anderson, a former marriage and family therapist, is aiming to become the Dr. Joyce Brothers of Y2K.

In a previous career, Anderson, now the president of KSA & Co., a Dallas-area direct marketing company, counseled couples and families on a host of interpersonal issues. Now she's applying that expertise to Y2K and aiming her message at women in particular in seminars, on her Web site (*www.y2kwomen.com*) and in her upcoming book, *Mars and Venus Look at the Year 2000 Problem: What Men Don't Understand, Volume 1*. Most attention to Y2K has

been geared toward preparing business and not enough consideration has gone into preparing households, which Anderson points out are typically run by women. She advocates preparing now for the emotional ramifications of millennium bug outages, disruptions and inconveniences affecting hearth and home—not after the fact.

Anderson warns that Y2K can be a source of marital strife. For instance, she says, a husband who fears the onslaught of technological disasters caused by the year 2000 may tap into his instincts as the family protector and want to turn the home into a survivalist bunker. Meanwhile, his more aesthetically sensitive wife may bristle at the thought of installing a wood stove in the living room or storing a six-month supply of Spam in an empty corner of the kitchenette. Her sage advice: "Just remember you both share something important: concern for the well-being of your family. Stay focused on that, and any disagreements or obstacles you face should be easier to overcome." Sounds like a good idea in any millennium. ■

ILLUSTRATION BY TRACY MITCHELL

## Network News

**MICROLASERS** Laser technology is everywhere, from your television remote to telephone networks. And soon it might be used to speed up communication networks as well.

Researchers at Yale University, Bell Labs and the Max-Planck-Institute of Physics in Germany are developing semiconductor microlasers that produce directional beams 1,000 times more powerful than existing disk-shaped microlasers. Microlasers are the smallest variety of laser—their size makes them useful in such fields as optical computing and networking. By deforming the disk of the cylinder-shaped laser, the researchers found that they could cause the light to travel in a bow-tie pattern, thus increasing the laser's output by causing it to produce four narrow beams. Each beam from the bow-tie laser has an output of 10 milliwatts of power, increasing the laser's total output to 40 milliwatts.

These smaller, more power-efficient microlasers have the potential to speed transmissions in optical local area networks and optical data processing applications, according to Federico Capasso, head of the semiconductor physics research department for Bell Laboratories, a division of Lucent Technologies Inc. in Murray Hill, N.J.

Capasso says it is difficult to predict when practical applications might blossom from the research, but he says the microlasers could satisfy demand for devices that increase the speed and bandwidth of existing communications networks or create new ones, thus allowing more data to be transmitted. "The technology could pay off in new applications in five years or more," Capasso says. "But this is long-term research that could yield technology...with a higher throughput." ■

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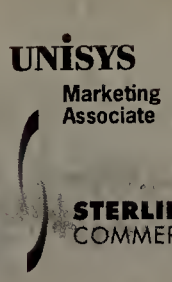

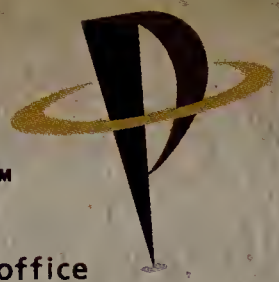

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# Trendlines

## Guardian Roaches

**ROBOTS** Ground-based soldiers are always challenged by "situational awareness," or the ability to figure out what's happening over the next hilltop or around a street corner. Two researchers from Vanderbilt University are currently working with a Defense Advanced Research Projects Agency (DARPA) grant to solve that dilemma using robotic bugs.

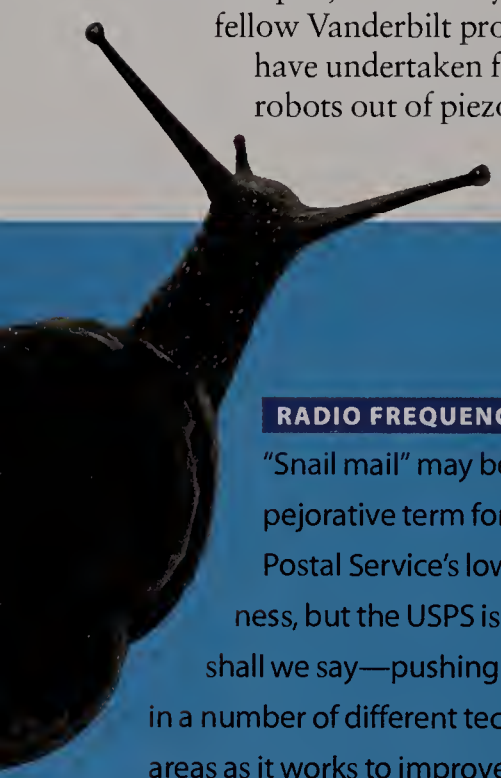
Having a robot carry around a camera or other sensor isn't a new idea. The trick, according to Ephraim Garcia, professor of mechanical engineering at Vanderbilt, is to make said robot small enough and energy-efficient enough to be effective. "In robotics, a lot of the stuff is kludgy, with a motor at every moving joint—it gives you about a 20-minute life span," Garcia says. The project Garcia and fellow Vanderbilt professor Michael Goldfarb have undertaken focuses on building tiny buglike robots out of piezoelectric materials, which naturally deflect or deform when hit with an electric current and produce an oscillatory motion in the material that can be translated, essentially, into a forward crawl. That efficient motion makes it possible to use a very small and inexpensive power source to move a robot, hopefully slimming each one down to about the size of a credit card.

To gather intelligence about its surroundings, a military unit could release a swarm of such bugs, both ground-based and airborne; losing one or several robots out of the swarm would have little effect on the overall success of the operation. Garcia notes that the robots also "give [soldiers] a tool so that they can put a machine at risk instead of a person." Once the crawling mechanism is perfected, the robots will be able to carry video or acoustic sensors on their backs.

Other possible uses for the bugs include reconnaissance on other planets—which is why NASA is keeping tabs on the project—and security applications.

"It could be sort of like a guard dog, or a guard roach," Garcia says. ■

ILLUSTRATION BY BARBARA FRIEDMAN



## The Postman's Progress

**RADIO FREQUENCY I.D.** "Snail mail" may be the pejorative term for the U.S. Postal Service's low-tech business, but the USPS is actually—shall we say—pushing the envelope in a number of different technology areas as it works to improve postal delivery speeds.

Among the USPS's research projects: radio frequency identification (RFID) tags used to track letters through the sorting system and thereby locate bottlenecks. The USPS describes the scenario this way: A tiny RFID tag can be attached to an envelope in a Washington, D.C., sorting facility, for example. The nearest facility's receiver picks up signals from the tag during its journey from the Washington facility to the Houston airport and finally to the Houston mail plant. By identifying delays in the journey, the postal service can pinpoint areas where mail gets bottlenecked.

Postal office managers in Houston, San Francisco and Washington, D.C., are currently testing RFID technology. The USPS worked initially with I.D. Systems Inc., a New York City-based maker of wireless monitoring and tracking systems, to make a prototype RFID system, and the trials are being conducted with the help of Savi Technology Inc., based in Mountain View, Calif.

"RFID is the wave of the future, and the Postal Service will be the first major industry to catch the wave," according to William Dowling, engineering vice president for the USPS. ■

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# Clock Wise

*When you run your systems 24/7, don't run your people—or yourself—into the ground*

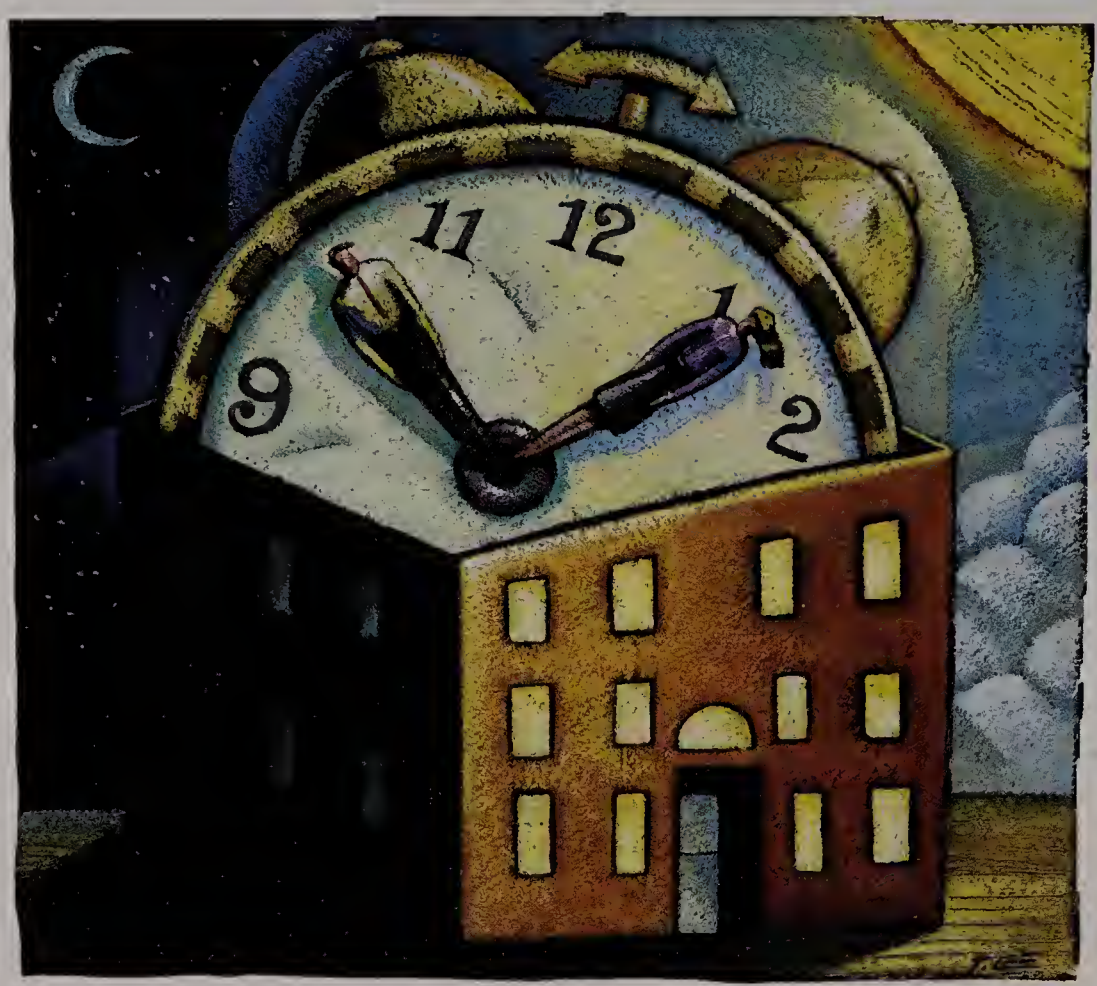
BY MATT VILLANO

EILEEN STRIDER LEARNED EARLY in her career what it's like to work in a 24/7 IT environment. As an IT staffer with a Midwest defense contractor, overnight systems administrators called Strider on her honeymoon to trouble-shoot a system error.

"It's two in the morning and I hear the phone ringing and I'm thinking, 'There's only one reason that phone can be ringing right now, and I know I don't like it,'" she says. "I ended up talking to the guy for over an hour and we still didn't solve it. Thank God my husband slept through the whole thing."

For companies with systems online 24 hours a day, planning round-the-clock staffing requirements tests even the craftiest CIO's wits. If you leave your system unattended overnight, a minor glitch could bottle up operations until morning. If you opt for a third-shift skeleton crew, hiring—and retaining—your late-night employees could be more trouble than it's worth.

So what do you do when you've got operations that never rest and people who must? Improvise. Innovative reorganization strategies, creative compensation packages for late-night workers, progressive alternatives to the traditional IT environment and explicit procedural documentation for the future are all ways in which you can turn your 24/7 operation into a model of efficiency.




For some, like Strider, former CIO of Universal Underwriters Insurance Co., a system that works can be found overnight. For others, like Rich Ogata, former director of network operations and technical services at CyberCash Inc., the process can be painful and agonizing, yet educational. Both Strider and Ogata emphasize, however, that when dealing with a 24-hour grind, you have to think of your own needs as well as the needs of your staff. Managing your employees' stress requires clever scheduling and organization, they say; managing your own stress is entirely different.

## Autonomy Is Key

As one-half of Kansas City, Mo.-based Strider & Cline, Strider serves as a consultant to companies with continuous IT operations. But her career began almost 30 years ago as a low-level IT analyst for the McDonnell Douglas Corp. in St. Louis. She climbed the ladder from third-shift trouble-shooter to second-shift programmer to daytime manager and, ultimately, to one of three positions directly under the CIO. In 1993 Strider moved across town to Universal Underwriters Insurance, where she was CIO until May of last year.

Not long after she arrived at Universal, circumstances made it imperative for Strider to initiate 24/7 operations there. Selling insurance to automobile dealerships across the country was not a round-the-clock business, but agents in the company's Kansas City headquarters processed orders from four different time zones. Mounting backlogs every evening forced the agency to run its systems all the time.

In the months immediately following the switch to 24/7, Strider had

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no formal plan for staffing the overnight shifts. A programmer was chosen randomly to be on call each night. When problems arose, whoever detected them phoned the programmer on call. In any given week, Strider estimates, one of her people was called upon at least five of seven nights. Morale, however, remained high, because of what Strider affectionately terms the "savior" syndrome.

"Did they like coming in to work in the middle of the night? No. But in the beginning, they loved being heroes," she says. "If they could fix the system time and time again, they thought they were proving they could save the company from total disaster. It was a macho thing. They saw themselves as indispensable, and they loved every minute of it."

**"My philosophy was to give people as much choice as I could. The more autonomy they had, the less put-upon it seemed they felt."**

*–Eileen Strider*

As the system grew, the 24/7 troubleshooting solution of the past began to falter, causing more late-night crashes, Strider says. Some staffers who had worked consecutive nights were too tired to perform their daytime duties properly. Others fell ill from physical exhaustion. Then, in early 1994, the company moved its data center from Kansas City to Chicago. With the center more than 500 miles from the IS staff, working without an overnight strategy would have cost the company far too much money. Strider says she had no choice but to completely rethink the way she had been dealing with 24/7 operations.

First, Strider ordered extra phone lines for the homes of almost 30 people on her IT staff. When staffers were called upon to fix problems after hours, they could dial in to the system from home rather than come in to the office, and they could trouble-shoot over the phone with systems analysts in Chicago about the repairs they were making as they made them. Universal picked up the long distance bills and paid the staffers a 15 percent premium for the work they put in from home.

While these initial steps didn't eliminate her staff's frustration with the 24/7 operation, Strider says they were important because they showed her people change was on the way. "These preventative actions gave my people hope that their lives would get better," Strider says. "I saw maintaining this sense of hope as a top priority, because without it, I knew there was no way I could prevent burnout [among them]."

Strider herself worked some overnight shifts and had an extra line installed at her home office so that she could help her staffers with the most difficult cases.

Months after the last of the home phone lines were installed, Strider unveiled a reorganization strategy that revolutionized Universal's approach to staffing in every department. She let her IT staffers divide themselves into teams, and each team was assigned a group of systems to monitor based on their expertise and their input. In all, there were five teams, one for each set of systems. Strider chose an IS manager to head each team, and she looked upon those leaders to schedule work rotations as they saw fit.

"As long as every team was monitoring its system 24 hours a day, seven days a week, I didn't care how they did it," she says. "My philosophy was to give people as much choice as I could. The more autonomy they had, the less put-upon it seemed they felt."

Strider set up ground rules designed to prevent burnout and improve productivity. All employees had to work a minimum of 40 hours each week, and no employee could work more than two consecutive overnight shifts in any four-day period. Telecommuters were required to supply their own hardware and to spend at least one day in the office each week.

Some staffers worked 10-hour days and others worked 12- or 15-hour days. Others instituted rotating on-call schedules or opted to work from home, telecommuting on the same phone lines installed to help maintain the 24/7 operations in the first place.

To her surprise, Strider says that few staffers had trouble adapting to the new system. The first time an employee required discipline, Strider let her team leaders handle the issue. If the employee's behavior didn't improve, Strider handled the situation herself. When delinquent workers failed or refused to report for their overnight shift, Strider instructed the leaders to plan their schedules for them. Strider says she remembers only a handful of discipline problems in three years. Not once, she adds, did she fire somebody for breaking the rules.

"They didn't ever abuse the system because it was a system they created," she says. "They were so proud of the way we had responded to the 24/7 question, there was no way they were going to do anything to ruin it."

Healthy competition between teams prompted everyone in IT to do better, and within a month or two the number of positive customer service reports from the data center in Chicago and from internal clients across the country went through the roof. Systems performance improved tenfold, particularly between midnight and 6 a.m. Perhaps most important, Strider says, department morale soared.

"It was the hero mentality all over again," she says. "Trying to run a system 24/7 is tough, no matter how you look at it. It's tough for your people and as a CIO, it's tough for you. But when you give your people the chance to do it their way, not your way, they tend to cope a lot better. It gives them a sense of ownership, a sense of control. And I guess it makes those desperate calls at one in the morning a bit more bearable."

### Get It in Writing

Managing 24/7 operations for a company like Universal Underwriters, a $650 million concern with a 160-person IT staff, is certainly a challenge. Imagine, then, managing round-the-clock operations for a startup with fewer than two dozen IT employees. Rich Ogata says that task was overwhelming and deleterious for CIO and staff alike. When Ogata, former director of network operations and technical services at CyberCash, was hired in 1993 to build the company's 24/7 operations, he did most of the work himself. At the time, the company was operating off three servers in the CEO's basement. Almost three years later, more than 200 people worked out of the company's offices in Reston, Va., and a handful of them maintained the company's 24/7 operations under Ogata's management.

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In the beginning, the company's IT staff was too small to warrant an overnight staffing plan. As it was, Ogata says, he'd work 14-hour days, often troubleshooting well into the night. As the company (and the IT staff) grew, however, so did the need for some sort of staffing strategy. Ogata decided to hire a handful of IT professionals to cover 10-hour shifts in a four-day workweek; one person would work mornings, one would handle afternoons and evenings, and one would tackle the overnight. A fourth person was always on call.

Still, Ogata never had enough operators to cover the company's operations around the clock. Weekend shifts were particularly hard to fill, and what Ogata couldn't monitor himself, he relied on electronic monitoring systems to detect. It was not uncommon, Ogata says, for the monitoring systems to page his staffers—and him—three or four times a night.

"I won't pretend we weren't on edge because we were," he says. "You had to be dedicated to the point of insanity. I told my staff I was going camping one weekend and one of my managers said something like, 'I can't believe [Ogata] is leaving his babies.' As important as it was to walk away sometimes, you never wanted to stray too far."

Burnout struck fast in this high-pressure environment, and Ogata says that at least two of his network engineers left because they couldn't deal with the stress. On the rare instances when other staffers failed to report for their shifts, Ogata had to pick up the slack himself, usually via his ISDN connection at home. With such limited resources, Ogata admits that aside from creative scheduling, there wasn't much flexibility he could offer his employees to alleviate feeling overwhelmed. In many cases, he says, impromptu pep talks were the best remedy.

Still, tempers flared regularly. Stress-related personality clashes occurred on a daily basis. One by one, Ogata's top four people, about a third of the IT staff, resigned over a seven-month period. As his staffers walked out the door, Ogata discovered just how much essential information each of them was taking. Weeks after people had left, Ogata found himself calling them to ask about a program they wrote or about a recurring glitch they fixed once or about where they had put a server they reconfigured. Out of this total chaos, Ogata says he learned his most valuable lesson as a CIO: document, document, document.

"When it comes to understanding 24/7 operations, there mustn't be bits of information locked up in people's heads," he says. "You can't be calling somebody after they leave saying, 'Where'd you put that server?' because that information is too crucial to systems operation for you not to know. As a CIO, you've got to have a good handle on all the procedures and responsibilities for every position on your staff, and it's got to be laid out explicitly in an employee manual."

With his staff severely decimated, much of the departmental work fell on Ogata's shoulders. Within a few months, the pressure became too great. After finishing an extensive manual of IT at CyberCash, residual stress from the resignations forced Ogata out last spring. Ogata tried a brief stint in the IT department of a nationwide bank; ironically, he found the pace too slow. Later this year he signed on as vice president of network applications at Emaginet Inc., another startup where he was hired specifically to develop the company's 24/7 operation from scratch. Now, he says, he's documenting everything as he goes, constantly trying to assess actual workloads. Already, he's seen that to run the system efficiently, he'll need to outsource the IT data center and establish a separate monitoring staff for all round-the-clock systems. Already, Ogata says, the lessons he learned in his last days at CyberCash are paying off.

"Sharing responsibilities—getting them out in the open and having your people understand them from the beginning—reduces the stress factor for everyone," he says. "When you're dealing with operations that go on all the time, people need to know what needs to get done and how they can do it. If you can't tell them that, if you can't get enough a grasp of your own system to put it to writing, there's no way you can expect your people to do things right. In the middle of the night, the last thing you want is a work-related phone call." CIO

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*Matt Villano is a freelance writer based in New York City. He can be reached at* whaleman@tiac.net.

## Is Your IT Staff Overworked?

THEY LIVE ON COFFEE AND PEANUT-BUTTER CUPS, the bags under their eyes could hold groceries, and still they put in 15-hour days. Still not sure? Look for these five top signs of staff burnout.

- **Declining health** The more tired your workers are, the more susceptible they are to falling ill.
- **Absentmindedness** Exhausted, stressed people are prone to careless errors. They overlook things they normally remember to inspect.
- **Flaring tempers** Can't we all just get along? Not on three hours of sleep, we can't. When your people bicker over simple things—lines of coding, a server password—you know it's time to break it up and give somebody the afternoon off.
- **Procrastination** Just as it's easy to stay on task when you're rested, it's easy to be distracted when you're not. Especially if your staffers have Web access, the possibilities for procrastination are endless.
- **Substance abuse** This is, without a doubt, the most serious of all the symptoms. Stress, both at home and in the workplace, can lead even the most stable people to drug and alcohol abuse.

*—M. Villano*

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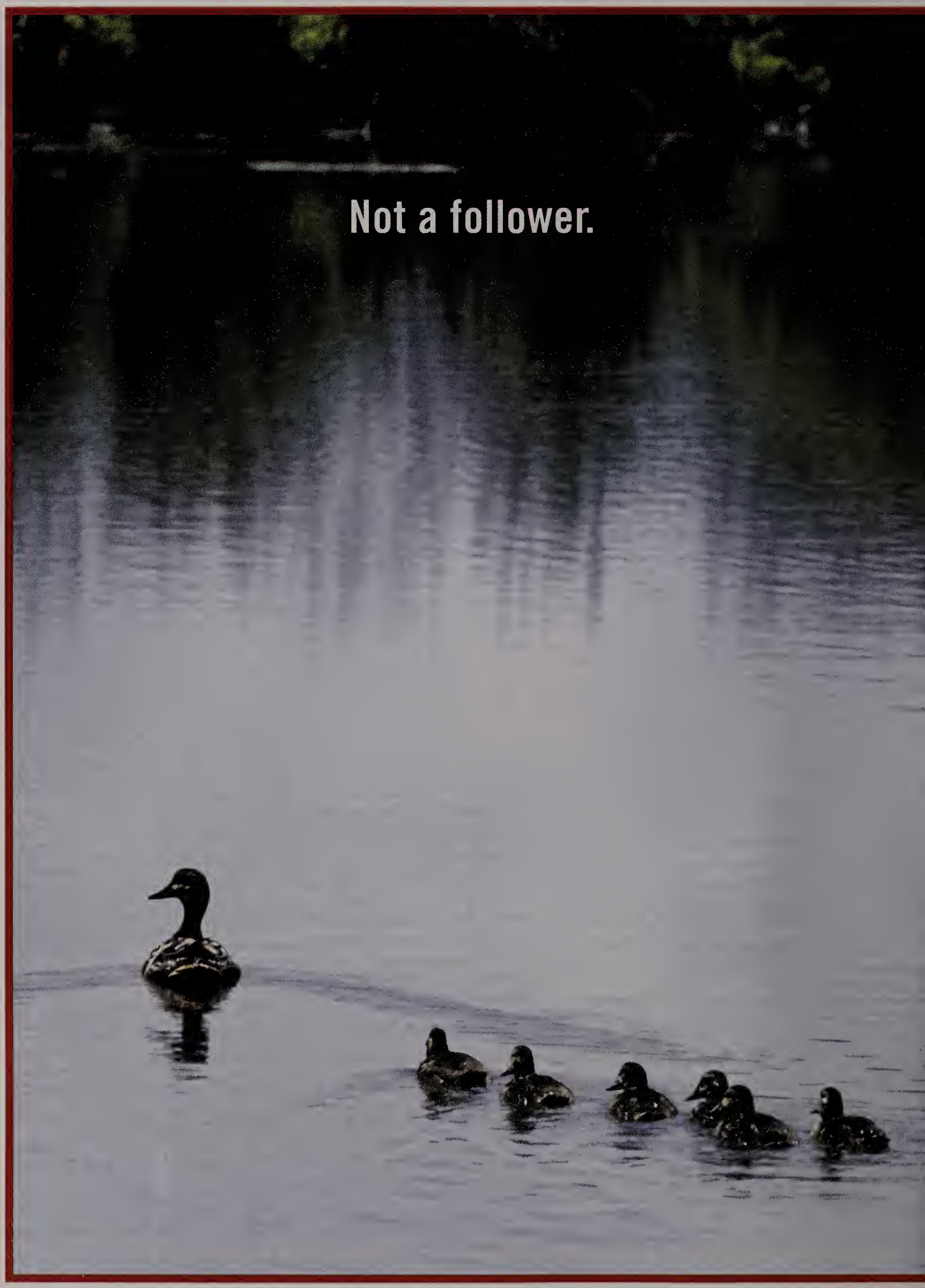
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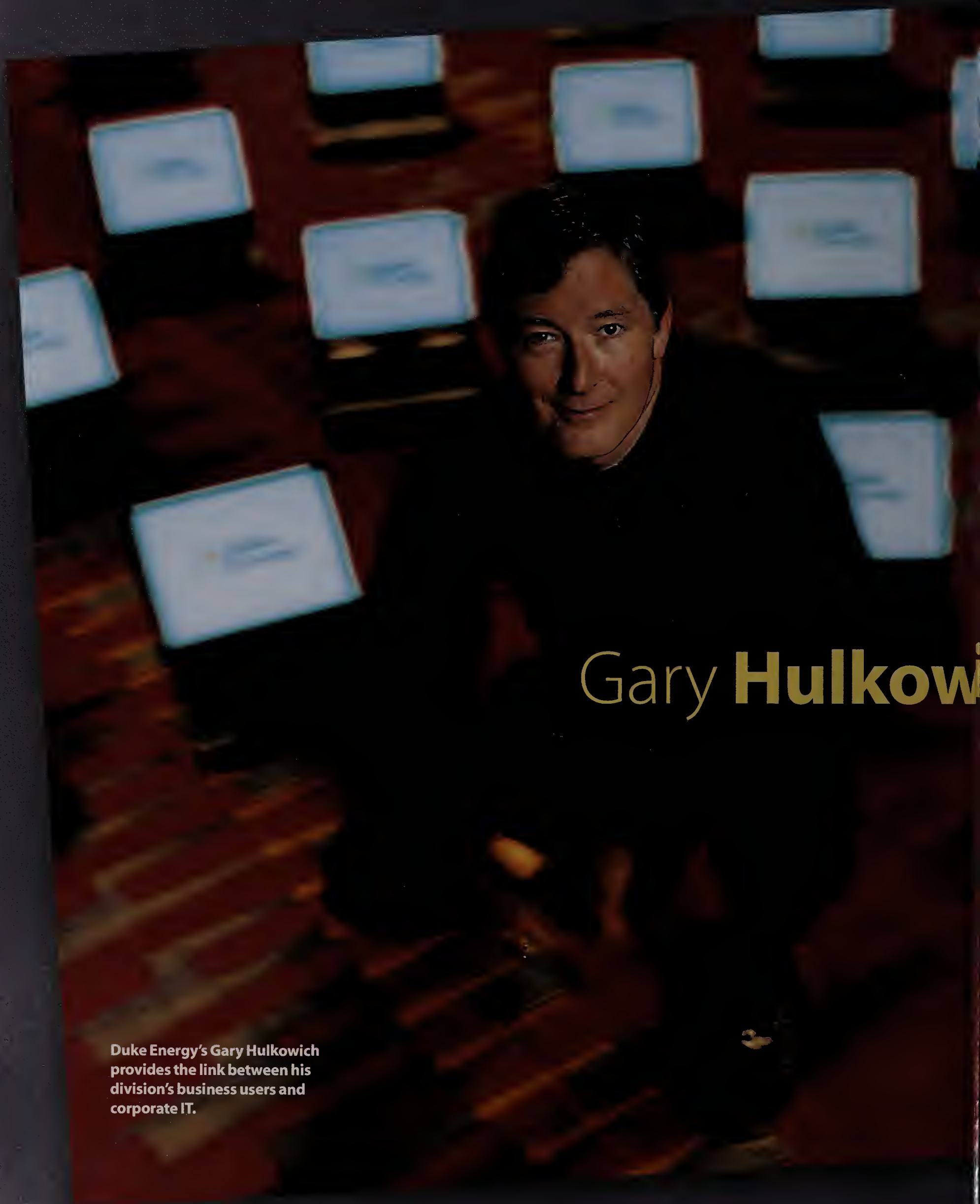

# Gary **Hulkow**

Duke Energy's Gary Hulkowich provides the link between his division's business users and corporate IT.

# Inclusionary Tactics

Planning a major systems change? IT operations personnel have the skills and the connections to ease the entire process.

BY LAUREN GIBBONS PAUL

**ich is one smooth operator**—when it comes to moving his company to a new IT infrastructure. Hulkowich believes IT operations professionals should ensure serene transitions by playing the crucial—but long-neglected—role of preparing their organizations to receive a new infrastructure.

That revelation occurred to him more than a year ago, when the electric-transmission business unit of his company, Charlotte, N.C.-based utility Duke Energy Corp., decided to move 1,000 corporate e-mail users from IBM Corp.'s Profs to Lotus Development Corp.'s Lotus Notes. Deregulation of the power industry was forcing Duke to respond to an increasingly competitive marketplace, and Duke senior management was determined to make the most of the company's information technology.

**Reader ROI**

BY SMOOTHING THE ROUGH EDGES—both human and technical—of IT transitions, operations personnel accelerate the return on their companies' IT investment.

This story will help readers

- Grasp the importance of enlisting IT operations as early as possible
- Explore the broad range of operations' contributions to smooth transitions
- Exploit the strategically advantageous relationship between operations and end users

PHOTO BY ROGER BALL / LIAISON INTERNATIONAL

Hulkowich, who has been with Duke for 10 years, is part of the 23-person IT group that senior management created to serve the 700-person business unit. The group provides end user support and makes sure the computer infrastructure—servers, PCs, network, printers and the like—runs smoothly. As his business unit's IT infrastructure manager, Hulkowich focuses on previously overlooked aspects of the transition. "I prepare the organization for receiving the new infrastructure products through training, communication and change management," he says.

In the past, according to Hulkowich, Duke's corporate information management (IM) group devoted its energies to deploying applications but paid scant attention to the needs of individual business units. "Training and change management—people tend to leave out these areas. But if you pay attention to these things, the costs of the deployment and the ultimate maintenance of the applications will drop.... The IM group isn't in a position to deliver these things because they're not close enough to the business unit," says Hulkowich.

"The **operations** group is **ultimately** held **responsible** for the **supportability** of the product."

–TOM WALKER

Regrettably, Duke's attitude is not unique. IT operations professionals work closely with end users, but they get little credit for doing what they do. Unless and until systems go haywire, everyone assumes the operations people are just doing their jobs, and few IT executives think to invite the operations staffs' participation when a new infrastructure is in the works: They are confident the operations people will support the new infrastructure just as they supported the old one. And that's that. Right?

Wrong. The role of an IT operations professional varies from one organization to another, but end user support is the common denominator. Enlightened IT executives now acknowledge that to execute a maximally efficient infrastructure change, operations people, whose duties position them to anticipate and forestall problems, need to play active roles in the process. And today, rather than simply handing finished systems to users and expecting the operations staff will automatically deploy their new applications, thoughtful developers are inviting operations' contributions right from the initial stages.

The payoff? Users are quick to embrace new systems, and by accelerating user enthusiasm, the organization enjoys greater employee productivity and realizes a prompt return on its investment.

In many companies, however, IT operations people are caught in a classic bind. Although they are expected to support new applications and hardware, they lack the clout to participate in the planning process. "The operations group is seldom invited to participate," says Tom Walker, CIO at DecisionOne Corp., a computer maintenance and IT support outsourcer in Frazer, Pa. "Supportability, operability, [total cost of ownership of systems]—these things are never fully addressed. [The implementation team is] focused on delivering a solution; they're not thinking about what it takes to run that solution. But the operations group is ultimately held responsible for the supportability of the product."

## Training and Timing

In years past Duke Energy did not involve its operations people in the early stages of major systems migrations. "The applications developers [from the corporate IM department] were chartered with preparing the business units to receive the product," says Hulkowich. But since corporate IT management didn't hold developers accountable for that process, user preparation seemed unimportant. The implementation team simply imposed the new system on users, and IT operations dealt with the subsequent chaos.

A few years ago, prior to dedicating local IT groups to individual business units, says Hulkowich, "we had sloppy rollouts that were not timed right." Either users were trained so early they had forgotten the new system before it went online,

PHOTO BY JOHN RAE

or training was so late users swamped the help desk with calls. And because the IM people in charge of rollouts commonly overlooked such tasks as performance monitoring and capacity planning, servers often crashed when new applications were turned on.

In all fairness, each rollout was so demanding that the IM department couldn't afford to make a full assessment of the business units' various training needs. For example, Hulkowich's unit, electric transmission, employs many field engineers who simply don't have time to report to a central office for training. Unless the IM team arranged training for engineers in the field, they missed out.

For the transition to Notes, however, the electric transmission unit had its own IT group to protect its interests. At the start of the project, Hulkowich analyzed the unit to determine what level of change it could tolerate and to optimize the transition schedule. To facilitate a low-impact switch to Notes, he planned just-in-time training, published newsletters and arranged such change-management activities as brown-bag lunches that doubled as training sessions. At noon, field engineers generally congregate in the crew rooms at the "tie stations," and Hulkowich held lunch-time training sessions there at shared workstations.

Hulkowich believes his group's efforts made a significant difference. "We got the users to accept this a little quicker than they would have. We set some deadlines for them, but we didn't shove it down their throats," he says. By scheduling training sessions well in advance, Hulkowich's team made sure all end users got Notes training the day they received the application. It was important for everyone to make a pain-free transition from the Profs mail system to the different capabilities of Notes. Users had to learn, for example, that although Profs allows senders to recall unread messages, Notes has no such provision. On the other hand, the Notes option of attaching Word documents and graphical files to messages added a significant e-mail capability.

Of course, Notes is not just an e-mail program. A much more powerful application, Notes has changed the way Duke employees work together. After years of exchanging documents in hard copy form, they have learned to use Notes's database and discussion-forum capabilities to collaborate electronically.

Hulkowich believes the extra training accelerated users' receptivity to Notes and enhanced their abilities to use it productively. "We didn't want just to train them. We wanted them to take advantage of the more advanced tools in the application in a shorter amount of time," he says.

Cecil Smith, CIO of Duke, agrees that users were more likely to accept the new technology from their local IT people—those with whom they work shoulder to shoulder every day—than they would have been if the rollout had been managed centrally by corporate IM. "Someone like [Hulkowich], who they see day in and day out is obviously one of them, one

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of their family," Smith says. "That's why we encourage this partnership with local IT. The remote and the central organizations can work hand in glove."

### Give It Time

Union Gas Ltd. always had planned to involve the IT operations people when it changed its system architecture. The company's executives just hadn't realized that the operations staff would need more time than they were allotted to adjust to the new system. Union Gas was moving from a mainframe-based system to an Intel distributed environment with IBM's AIX servers for the back end, Microsoft Corp.'s Windows NT servers for the front end and 3,000 clients running Windows 95 or Windows NT. About halfway through that multimillion-dollar conversion, IT execs at the Chatham, Ontario-based utility began to reconfigure operations functions such as backup, disaster recovery and software distribution. At that point, the mainframe operations people were brought in to learn how their job responsibilities would be affected by the changes.

But the operations staff in this case were old-school mainframers who had no training on distributed systems, and they were frankly uneasy about the proposed changes. "They were skeptical of the distributed environment from the beginning. They didn't really believe in the technology," says Gord Lamb, then manager of systems management at Union Gas, who was in charge of developing and implementing the processes, procedures and tools to support the new infrastructure. "Their attitude was, 'This isn't going to work, and we're not going to help it work.' It was like pulling teeth to get them involved. The operators were doing exactly what they were told and nothing else."

To address that problem, his boss, Manager of Infrastructure Steve Calhoun, suggested altering the organizational chain of command so that the operators would report directly to Lamb. Under the previous reporting structure, it had been "too difficult to get their buy-in," he says.

With the authority to direct the operations people, Lamb focused on making them less resistant to the new systems and provided them with training. He believed a fellow operator would be a more credible teacher than an outsider, and he "appointed one lead operator, one who had an open mind. We took him and did the train-the-trainer approach," he says.

In the three months it took for the operators to get used to the new system, they became its enthusiastic advocates. They knew they were uniquely positioned to uncover system weaknesses, and they actively offered fresh suggestions and insights. Noting what Lamb describes as "the logistical nightmare of rotating tapes," one operations person suggested replacing the daily offsite tape backups with one weekly offsite backup. "It brought common sense to the process," Lamb says. The revised protocol was not without some trade-offs, however. "We did increase the risk of problems if we had a disaster, but on balance we felt the logistics of doing it once a week were better," he says.

> "We **encourage** this partnership with **local** IT. The **remote** and the **central** organizations **can** work **hand** in glove." –CECIL SMITH

### Transition Plan

Simply put, Digital Equipment Corp. would never have made it through its 1996 IT hardware and software infrastructure change without the intense interaction and involvement of operations staff, both at home and in the field.

Tom Simmons, vice president of connectivity and computing services *[Editor's note: Unless otherwise noted, all Digital employees have become Compaq Computer Corp. employees as a result of Compaq's acquisition and reorganization of Digital. Employee responsibilities are generally the same.]*, and his team had 18 months to move more than 55,000 clients using All-In-1 or VMSmail e-mail in a proprietary OpenVMS DECnet environment to a Digital Alpha-Microsoft Windows NT environment running Microsoft Exchange mail. Digital Intel-based servers running Windows

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"Involving **operations people** at the **beginning** and making them **accountable** for delivery processes **improved** our ability to be **successful**." –TOM SIMMONS

NT are also part of the new environment.

That immense labor required replacing systems at Digital locations in 40 countries. Time constraints alone made it unworkable to direct the companywide systems change from world headquarters. So gathering representatives from Digital's worldwide IT operations staff, the company formed a central team to oversee the deployment.

"The pace of change today requires you to have the IT operations people involved in the front end and have them assist in walking the other parts of the organization through the changes," says Dick Fishburn, former vice president and CIO at Digital. "The local operations teams have to take an active role. They are the change leaders."

Al Laude, mail/messaging service operations manager, explains, "We were looking at the big picture—all the pieces that go into the new infrastructure." He was one of three Digital managers who headed up groups that provided an interface between the central deployment team and the IS operations staffs at Digital outposts around the world. "We wanted to make sure we wouldn't fall into the trap of just throwing things over the wall."

According to Simmons, "We wanted to deliver a highly stable and predictable environment from the start and then provide passionate and knowledgeable support.... By involving [operations people] at the beginning and making them accountable for the delivery of each of those processes, it improved our ability to be successful," says Simmons. In short, he maintains that failure to involve operations would be "like a coach wanting to win but not involving the players in the game plan."

And Digital's operations staff proved to be most valuable players. For example, operations personnel devised a way to reduce the time it took to install and start up system software on desktop PCs—by 80 percent. The automated "gold disk" process, which refers to a CD with the software upgrade, replaced the conventional approach, which would have taken about five hours for each PC.

In Digital's far-flung offices, local IT operations people alerted the central deployment team to local differences that could have resulted in legal and other problems. For example, in Europe, the plan for assigning a unique identifier to each Digital network user might have run into serious roadblocks. Both Germany and France have strict privacy rules that forbid the disclosure of identifying numbers or user passwords outside the country. With advance warning from the German and French operations staff, Digital kept the issue manageable. "Operations has that on-the-ground perspective," Simmons says.

Keeping Digital's operations staff up-to-date did, however, exact its toll. The leaders of separate projects around the world insisted on communicating regularly with the company's 100-plus IT operations professionals and other team members involved in the overall rollout effort. Individual program groups organized their own calls to focus on their particular projects. For example, Joel Johnson, the program manager for the Windows NT rollout and later Digital's connectivity and computing services technology manager, scheduled one regular weekly call, Thursdays from 9 a.m. to noon, Eastern Standard Time. His people in Asia-Pacific exhibited true devotion to successful implementation: On Thursdays they capped off their normally crazed day with those three-hour conference calls, which for them started at 10 p.m.

Everyone's dedication paid off: 40,000 Digital users were on the new system by April 1997, two months ahead of the June 1997 deadline, and that number reached 55,000 by the deadline. "We haven't had the party yet, but everybody slept for a full night," says Laude. CIO

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*Lauren Gibbons Paul, a freelance writer in Belmont, Mass., can be reached at* laurenpaul@sprintmail.com.

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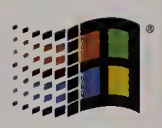

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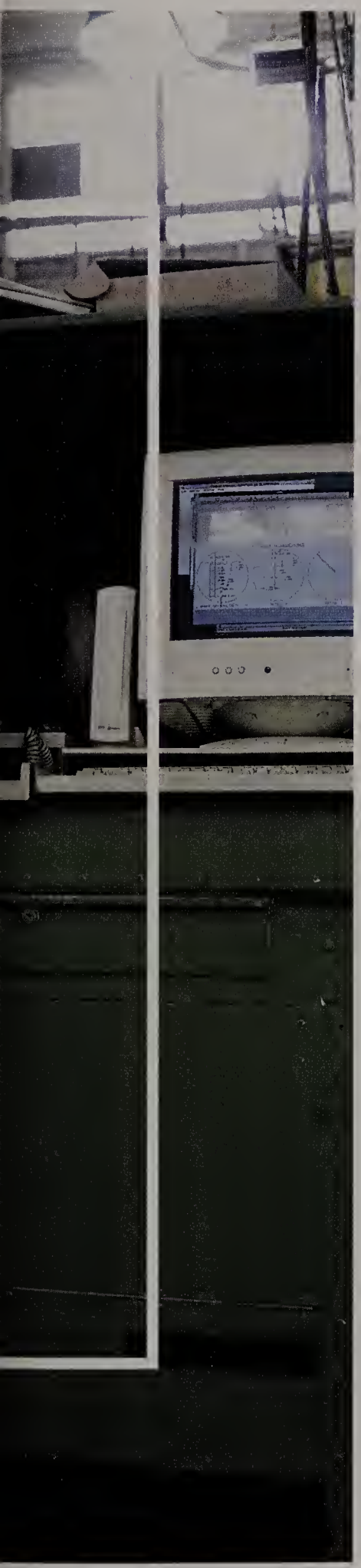

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# A SEPARATE PIECE

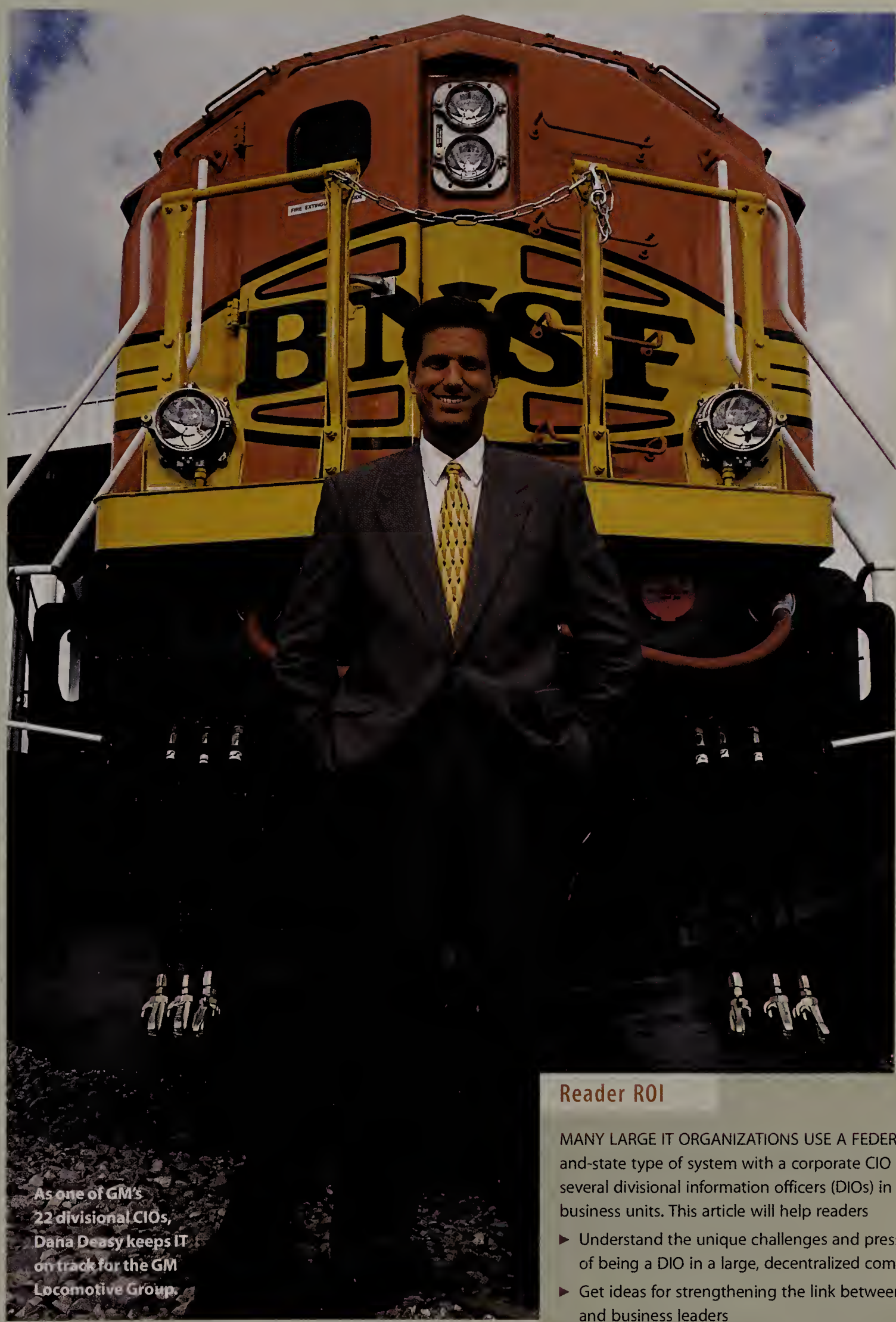
BY LAUREN GIBBONS PAUL

*At companies that assign an IT department to each business unit and a CIO to each IT department, divisional CIOs enjoy a life far different from that of their corporate counterparts*

WHEN DANA DEASY JOINED General Motors Corp. last year as one of 22 divisional CIOs, he had to teach his new colleagues in the General Motors Locomotive Group (GMLG) what a chief information officer does. GM was about to pull out of the exclusive relationship it had had with its IT outsourcer of many years, Electronic Data Systems Corp. And Vice President and CIO Ralph Szygenda was winding up his first year at GM, which he had spent building an Information Systems and Services (IS&S) organization from scratch.

"When I walked in, there were only four people on staff [in my division] that had anything to do with IS. I started with nothing," says Deasy, CIO for the approximately $2 billion locomotive division in LaGrange, Ill. Because of the confusion and uncertainty once GM ended its exclusive outsourcing arrangement with EDS, Deasy had to explain that his role was to match technology to the needs of that particular division.

Teaching GM employees about the role of a CIO was especially important under the new IS&S structure, which Szygenda had designed to incorporate several layers of information officers. As corporate CIO, Szygenda was at the top, with the 22 divisional chief information officers, known as DIOs, under him. Under the DIOs were the company's process information officers (PIOs), responsible for implementing common processes and




As one of GM's 22 divisional CIOs, Dana Deasy keeps IT on track for the GM Locomotive Group.

PHOTO BY JOHN HARQUAIL

## Reader ROI

MANY LARGE IT ORGANIZATIONS USE A FEDERAL-and-state type of system with a corporate CIO and several divisional information officers (DIOs) in the business units. This article will help readers

- Understand the unique challenges and pressures of being a DIO in a large, decentralized company
- Get ideas for strengthening the link between IT and business leaders
- Learn the difference between the life of a CIO and a DIO

systems throughout GM's divisions and regions, as well as regional information officers (RIOs) assigned to designated geographical areas such as North America, Europe and Asia. As a result, 32 people within GM would be sporting the words "information officer" in their titles, so everyone needed to know what they were doing there.

The cadre of divisional CIOs began putting together strategic IT plans for their respective business units that encompass goals, opportunities and competitive threats for the divisions. As Deasy describes it, all of GM's DIOs are in the throes of creating their strategic plans and trying to staff up their own IT groups. The pace is quick and the market unforgiving—especially in the aftermath of this summer's painful, two-month-long strike that halted company assembly lines and cost GM billions—but, Deasy says, at least GM's DIOs have each other. "It helps that we're all in the same boat, facing the same traumas and frustrations," he says.

GM may well have a significant number of "IOs" per capita. But many other large companies also have a corporate CIO and several other CIOs at the divisional level. These DIOs are operationally oriented line IT executives. They often see themselves as pragmatic, delivery-oriented doers; the corporate CIO, on the other hand, is often the thinker, chartered with formulating a strategic IT vision for the enterprise. Often the DIO reports to the general manager of a business unit with a "dotted line," or loose accountability, to the CIO.

This decentralized structure can work well for big companies with a number of autonomous business units. The philosophy is that each division's distinct technology needs are best served not by a staff CIO but rather by a line CIO, or DIO, charged with looking out for that division's individual technology needs and interests. At a company as large as GM—which, at $180 billion in revenues, is the world's largest company—it would be impossible for corporate CIO Szygenda to implement and manage all the company's IT initiatives. That's where DIOs come in, with their intimate understanding of their own business unit's needs. That said, it would be too expensive and impractical to deliver and maintain IS without some degree of standardization, so the corporate CIO serves as standards-setter and visionary.

**As DIO for GE Power Systems, Jean-Michel Arès sets strategies for his division and relies on GE's CIO to provide him with the corporate perspective.**

"Typically, it's the DIO who has responsibility for making all IT things happen in a division," says Jim Webber, president of Omicron, a consortium of IT executives from 100 large companies, in Mountain Lakes, N.J.

For example, at GE Power Systems, a Schenectady, N.Y.-based division of $91 billion General Electric Co., CIO Jean-Michel Arès controls the implementation of technology initiatives and strategy for his division; GE's Senior Vice President and CIO Gary Reiner reviews his decisions to ensure they jive with overarching corporate goals such as quality and efficiency.

"I set the strategy for Power Systems, but through a regular review with [Reiner], I get perspective on what the other business units are doing," says Arès. "[Reiner] sets an overall direction for the company, and that's absolutely critical in a company as complex as GE. You need common platforms and infrastructure and you need someone to help you think through the issues for your own unit."

Like more traditional CIOs, GM's DIOs lead sizable staffs and command multimillion-dollar IT budgets. The difference is in addition to making IT decisions for their divisions, they must also take a broader view of the impact of those decisions on GM as whole. The CIOs of GM's seven business units command IT organizations worth hundreds of millions in their own right, with several layers of information officers below them.

Roughly 250 IT executives comprise the virtual IS&S organization, which is responsible for developing GM's IT strategy and overseeing the execution of that strategy by outsourcers. GM CIO Szygenda believes this structure keeps overhead as low as possible while aligning IT with the business. "The CIOs of our business sectors are better able to meet the IT needs of those businesses

PHOTO BY ROBERT MESCAVAGE

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because they participate in the management and intimately understand the priorities. And as part of the central IS&S organization, they can enjoy the economies of scale offered by global commonality and standards," says Szygenda, at GM headquarters in Detroit. In fact, he says that "since its inception in 1996, IS&S has reversed the upward trend of IT spending at GM" by implementing common systems such as SAP R/3 and PeopleSoft. Immediately after they signed on at GM, Szygenda asked the DIOs to prepare detailed individual business plans that detail goals and opportunities, outside competitive threats, specific commitments, costs and deadlines—a process that's still underway.

### Reporting Structure

Ask any of GM's DIOs about their experiences and the first thing you're likely to hear is that they are strictly accountable to both Szygenda and the general managers of their units. This dual reporting structure is central to the way DIOs view their role at GM: serving two equally important masters. It differs from the situation where a DIO reports to a business head and has a dotted line to the CIO.

Having dual accountability requires the DIO to focus on his duties to the division and the broader corporation simultaneously. "This model is being used more and more, at GM and elsewhere," says Dan McNicholl, CIO for GM's North American Operations (NAO) in Warren, Mich., who reports both to Szygenda and to GM Executive Vice President and NAO President Rick Wagoner. In addition to reporting to GE's corporate CIO, Arès reports directly to the president and CEO of GE Power Systems, Bob Nardelli.

Gene Raphaelian, vice president of executive programs for Stamford, Conn.-based GartnerGroup Inc., confirms that dual hard-line reporting for the divisional information officer is a growing trend. "About seven years ago, when I first started looking into this, there was a lot more autonomy for DIOs. In many cases they reported only to a divisional general manager," says Raphaelian. But with the advent of the networked enterprise and widespread implementation of enterprise resource planning packages like SAP and Oracle, DIOs increasingly have had to answer both to the divisional general manager and the corporate CIO, who typically would head up the ERP implementation. "Today, 8 or 9 out of 10 DIOs report to both now, as opposed to 4 or 5 out of 10 just a few years ago. It makes a lot of sense. Companies want to make sure [DIOs are] acting locally but thinking globally," he says.

> *The dual reporting structure is central to the way DIOs view their role at GM: serving two equally important masters.*

Where some observers caution that the decentralized DIO-CIO reporting structure often results in DIOs following the interests of their divisions to the exclusion of the enterprise, Szygenda is a charismatic leader who's been able to command loyalty from the DIOs despite their natural inclination to serve their business units first. He has imbued Deasy and McNicholl (and presumably his other DIOs) with the understanding they serve both the greater good of the company and their respective operating units. "[Bill Happel, GM vice president and GMLG's general manager] is interested in what I have done to improve the bottom line for the locomotive business,

## Book It

*Seeking IT governance help? Let the founding fathers be your guide.*

IF YOU'RE LOOKING FOR A WEIGHTY TOME TO TAKE YOU INTO FALL'S more serious climate, Paul Strassmann, former Xerox Corp. and Department of Defense CIO, author and consultant, recommends the Federalist Papers, which he says should be required reading for all CIOs. Yes, he's serious.

"When you look back over 40 years of computing, the pendulum has continually swung back and forth between centralization and decentralization," says Strassmann. Debates involve issues such as who pays for IT, how conflicts are resolved between CIO and DIO, and what sort of voice the users have in IT matters. These questions have their roots in issues such as taxation, fair representation, due process and the legitimacy of government that Alexander Hamilton, John Jay and James Madison debated in the Federalist Papers in 1787 and 1788, he says. (Strassmann also considers his own 1994 book, *The Politics of Information Management*, required reading for CIOs who are interested in IT structure issues, since it contains 120 pages on IT governance issues.)

Once they've read the Federalist Papers, CIOs should be inspired to go out and convene their own Constitutional Convention of sorts to spell out exactly how their organization will be governed. "No one's doing the hard work necessary to spell out governance," laments Strassmann. He recommends the CIO convene representatives from all groups that have a stake in information technology to hash out the knotty issues of rights, taxation, decision making, limits on power and accountability. Lofty as it may seem, Strassmann also recommends CIOs spell out the three functions of the U.S. form of governance: executive (presumably the CIO), legislative (perhaps the representatives from the business users) and judiciary (perhaps the board of directors).

*–L.G. Paul*

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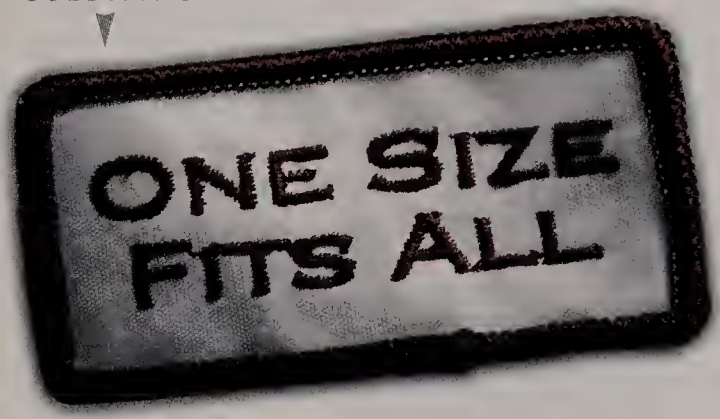


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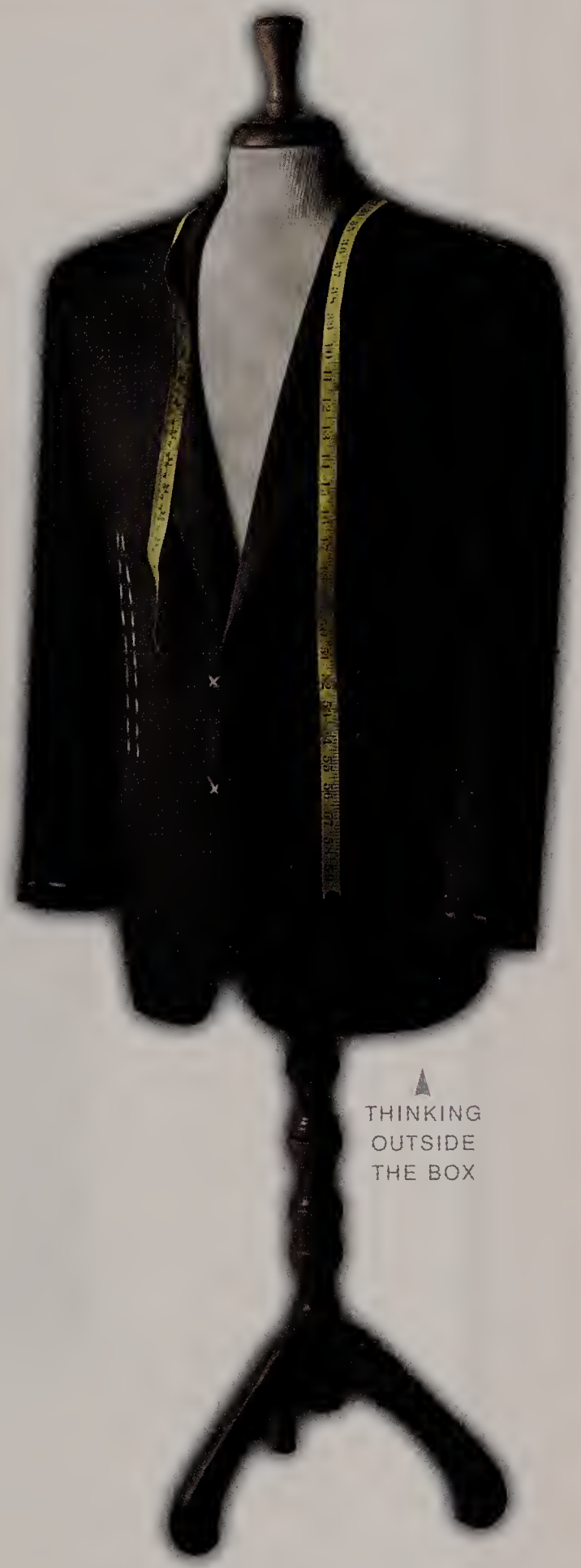

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# THe CIO IS iN THE hot seat as the executive

committee drills one department head after another on escalating costs. How are you going to [1] (get the newly acquired subsidiary onto our e-mail system)? How are you going to [2] (hold down your network administration head count) as you add hundreds of new users? How can you afford to [3] (roll out new apps to the whole company)? It's like the Spanish Inquisition, but the food is worse. Her stomach rumbles from the dry turkey sandwich and yuppie water served at the start of the meeting as one committee member wakes up long enough to ask about the [4] (Year 2000 problem) he saw on a CNN segment. "Not a problem, we have it covered," she replies. With an unforeseen compliment for completing the [5] (global supplier extranet) project, she is excused. Exiting, she smiles at the beleaguered marketing director, who is about to be skewered because the company's celebrity pitchman has just appeared on the cover of a supermarket tabloid.

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while [Szygenda] wants to make sure what I'm doing is consistent with the rest of the corporate standards. I have to help GM as a corporation become leaner and more global," says Deasy.

In a previous job, Deasy was CIO for a business unit of Rockwell International Corp. and was only loosely accountable to the corporate CIO. He sees a difference between the reporting structure there and at GM. "Here I'm truly looking out for what's best for the corporation as a whole," says Deasy, whereas at his old company, "my allegiance was much more just with that divisional unit. Whether or not you could achieve commonality was not always a priority."

GM's dual reporting structure keeps its DIOs focused both on their respective business units and the broader corporation. But there are perils in reporting to both a line executive (the head of the business unit) and a staff executive (the CIO). When he took the job, Deasy recalls his friends in the industry thought the structure sounded like an ordeal.

"You enter it with some trepidation, dual hard-line reporting. Everyone thought it sounded like a nightmare. But it has not turned out that way," says Deasy. So far, both Deasy and McNicholl say they haven't had to favor one boss over the other or one mission over the other. But one has to believe the balance is tenuous, that the scales must sometimes tip toward one of them.

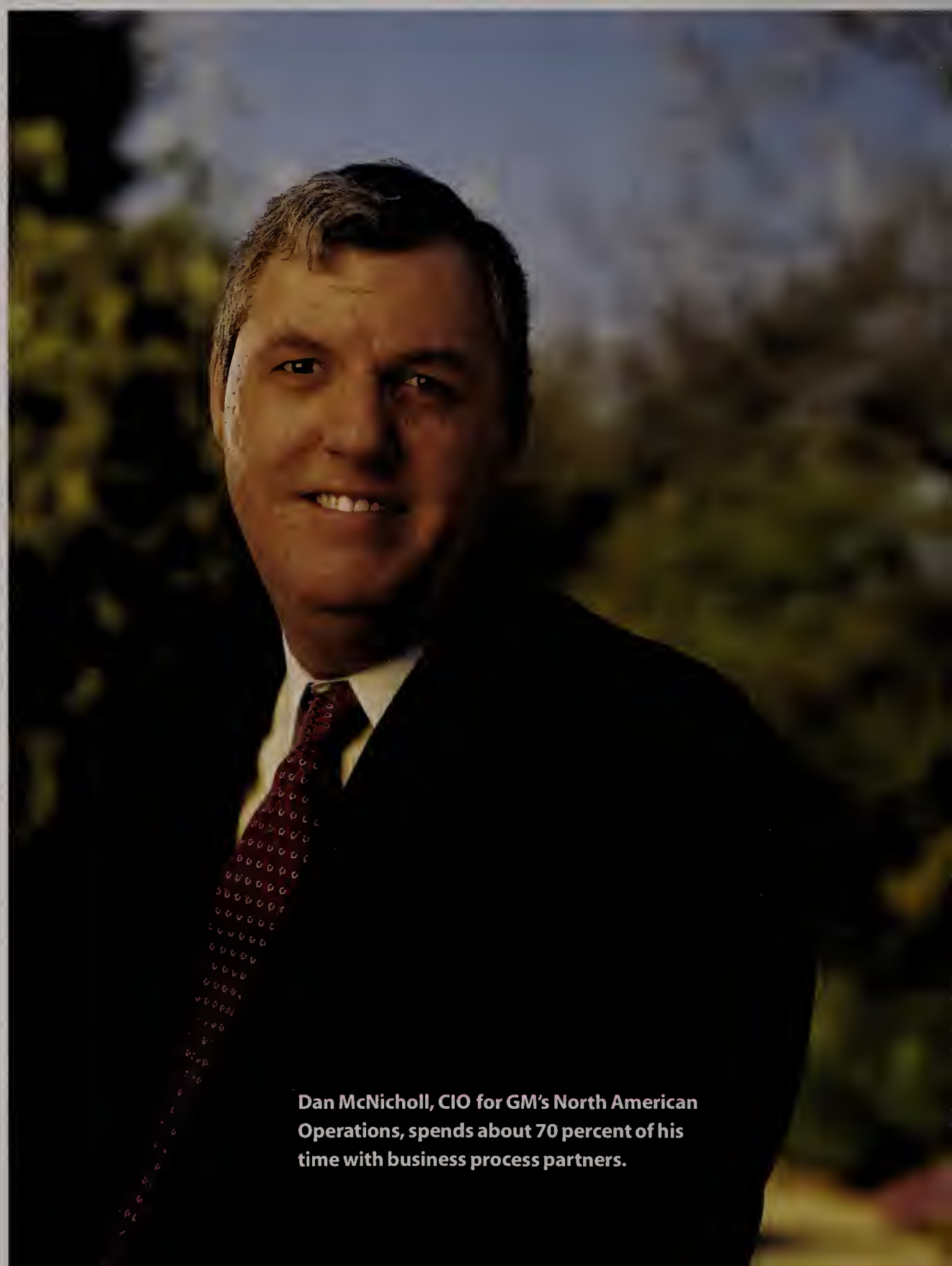
"The divisional [business] executive is the one who makes the money and ultimately pays [the DIO's] salary, whereas the CIO is in a staff role. If there's a fight between the staff guy and the line guy, you know the line guy will win," says Dean Meyer, president of NDMA Inc., a Ridgefield, Conn., research and consulting company that specializes in organizational design. "Dual hard-line reporting is a patch, a symptom that something deeper is wrong. In time, I predict divisional CIOs will build their own empires and come to view their job as defending their business units against corporate."

Meyer is not alone among his consulting brethren in casting a jaundiced eye on dual hard-line reporting structures. GartnerGroup's Raphaelian has seen large companies plan GM's type of structure and fail. He senses that DIOs will ultimately take what's best for their divisions over what's best for corporate if there aren't any checks and balances in place. "The divisions tend to go their own way, except for huge decisions like labor issues and other things," he says.

Paul Strassmann, former CIO for Xerox Corp. and the U.S. Department of Defense, consultant, author and expert on issues of IT structure, snorts at the very idea of a dual hard-line reporting relationship. "Dual is a vacuous term. It has no operating viability. No one knows what it means," says Strassmann, who is based in New Canaan, Conn.

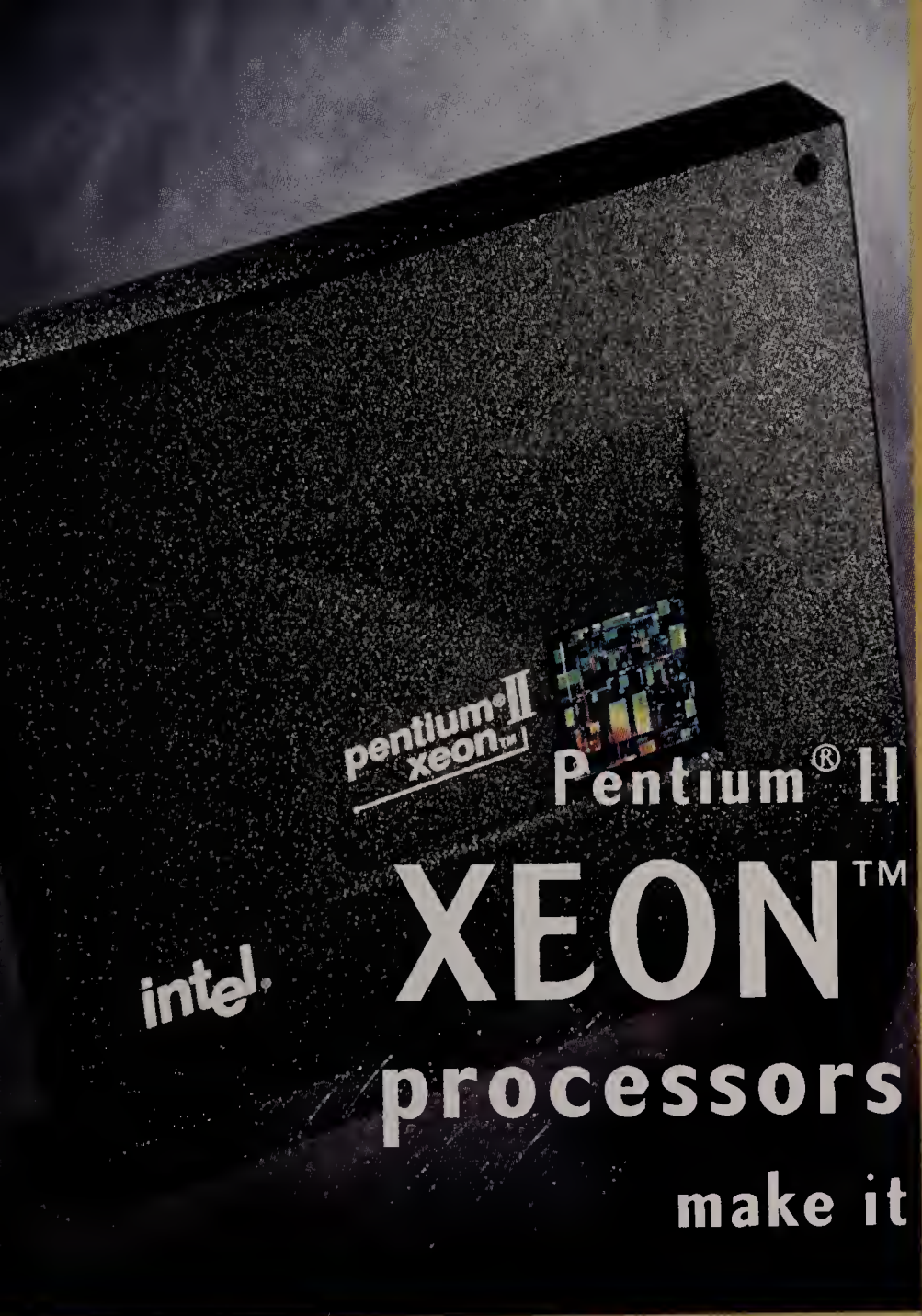
Many times companies set up a structure with a corporate CIO and DIOs, but they leave themselves open to civil war because there is no provision for conflict resolution, says Strassmann. "They need to learn a lesson from good old American constitutional law," he says. "There must be a separation of powers, checks and balances, due process." In other words, what happens when the CIO and DIOs differ? What happens when there is a conflict of priorities between corporate and the business unit? These critical questions are seldom addressed—either by top corporate management or IT executives—prior to setting up an IT organization, says Strassmann.

Dual reporting can work, but only when each DIO has a clear understanding of how his or her unit fits into the mechanism of the larger company and



**Dan McNicholl, CIO for GM's North American Operations, spends about 70 percent of his time with business process partners.**

PHOTO BY REID ASHTON





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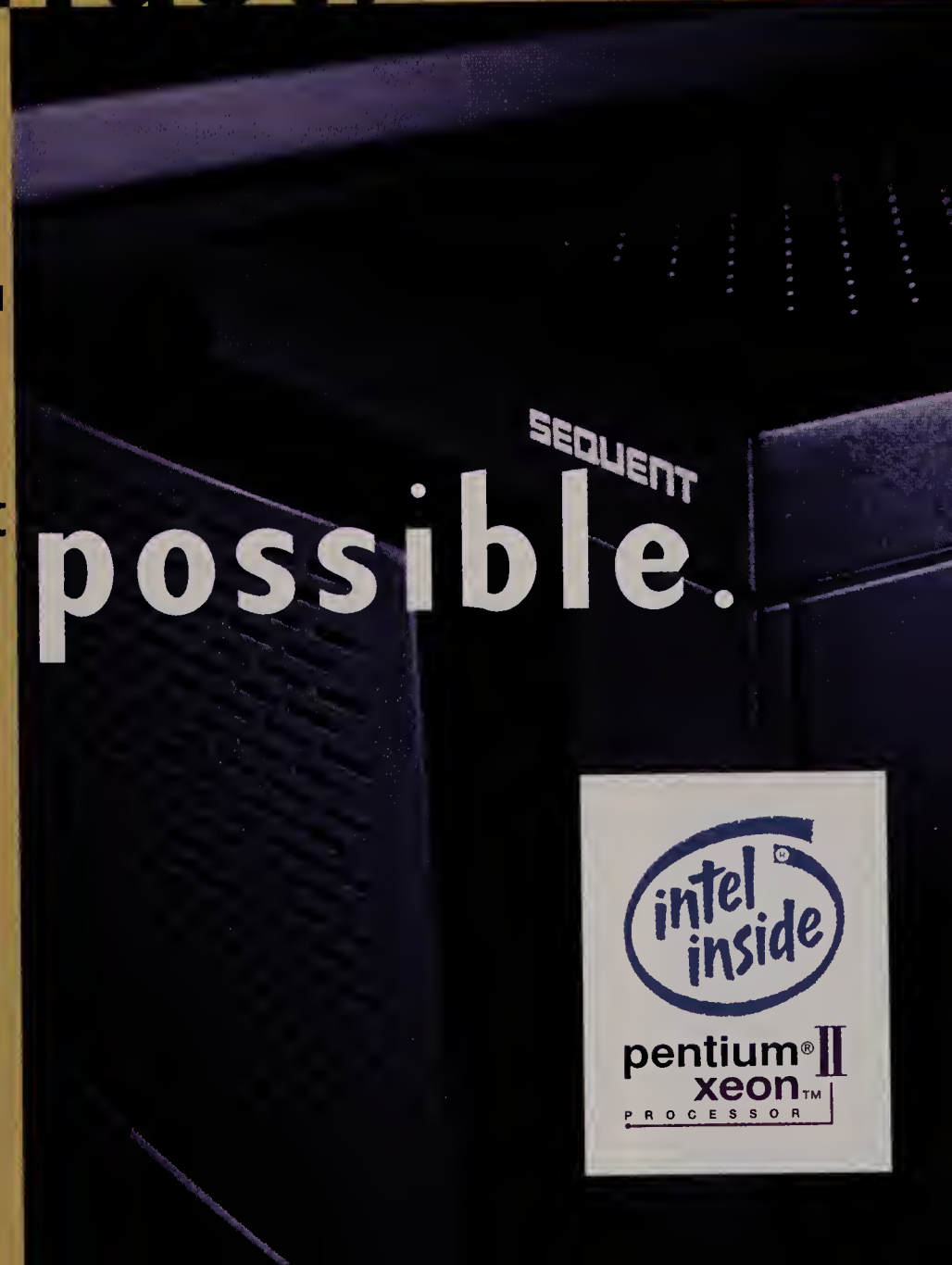

when the corporate culture supports "firm first" thinking, according to Raphaelian. "If I as a DIO understand how I feed the greater corporate ecosystem, I know how I can best work with the corporate CIO. Otherwise, I'm going to look after my division first," he says. He knows that dual reporting can complicate a DIO's life, but he believes it's necessary, except when a division has markets and customers that are completely different from those of the parent company.

### Connect to the Business

No matter what reporting structure a company assigns to the DIO position, the link between IT and the business is still extremely important, since being in sync with business needs is the primary reason companies have DIOs in the first place. Along with formal rewards such as promotions, pay raises and increased responsibility, McNicholl gives out Three Musketeers bars as an offbeat way to compensate IT staff who reach out to their business counterparts, going beyond their standard commitment to teamwork and excellent customer service. "IT leaders have to form very effective partnerships with the business communities they support. That's easy to say and difficult to do. I like to recognize people who help their partners where they didn't have to," says McNicholl. "It sounds corny, but people were very excited to get these candy bars."

And to remind himself to share his knowledge of key topics such as strategy, systems, implementation and people with the broader IT organization, every week McNicholl writes himself an inspiring message on an index card that keeps on his desk. Recent notes include "Don't forget to give your people credit" and "Remember you're part of a larger team."

Because Szygenda makes sure his DIOs see each other often, both formally and informally, McNicholl and Deasy also feel part of a larger team that transcends their respective business units. Along with Szygenda's other direct reports, they meet monthly with Szygenda for a half-day forum during which all the DIOs report on their initiatives and discuss ways they might be able to help each other, disseminating their expertise outside their discrete business units. GM's DIOs, who all took their posts less than two years ago, spend a lot of time at these meetings sharing their knowledge, discussing their problems and ways they've overcome them. They also discuss ways to help each other, such as recently when McNicholl sent two IT managers from the NAO Car Group and Powertrain organizations on a year-plus assignment to help his Asian DIO counterpart set up a new GM assembly plant in Shanghai.

"NAO had expertise in the particular systems they were implementing. There's nothing in it for me, except knowing I helped my colleagues, which in turn helps GM become more global," says McNicholl.

As for face time within the division, Deasy sees Happel and other business sector executives about four or five times a month. "The guiding principle is that we [should be spending] about 70 percent of our time with our business process partners and 30 percent with our IT counterparts," says McNicholl.

### Goals for the DIO

McNicholl and Deasy say they are not harboring grand aspirations to hop into Szygenda's seat any time soon. GM is such a huge company that there are a multitude of places to move, including the top executive position within the divisions. If there's one thing most DIOs thrive on, it's being part of the hurly-burly of daily company business.

In fact, many DIOs see their position as a much more desirable place than the corporate CIO spot to live out their careers. DIOs sometimes see the corporate CIO as being hamstrung and not in control of his own destiny, says Omicron's Webber. "A lot of [corporate CIOs at the largest companies] don't have the money or power to accomplish much, but they still have accountability to the CEO," he explains. Corporate CIOs often don't have good answers to questions from the CEO like, "How much are we spending on IT [across the enterprise] and why is it so much?" and "What value are we getting from our IT dollars?" While they need to know those answers for their own divisions, DIOs are not responsible for the answers as they apply to the enterprise as a whole.

The CIO may be paid more, may be more prominent, may have better stock options and other perks, but many DIOs are not willing to trade in their autonomy. They are wary of being held responsible for things they don't control.

"Our current CIO has done an excellent job managing soft skills, but he has no direct authority. Let's say he wanted all the divisions to put up the same general ledger package. The chances of him getting all the divisions to do that are very slim," says a DIO from a large pharmaceutical company who requested anonymity. "It's tough for him since he doesn't control the budgets."

*DIOs wouldn't want to trade places with CIOs. They're unwilling to give up their autonomy and they're wary of being held responsible for things they don't control.*

The DIO admits that at one time he coveted the CIO crown. He was in line for the corporate CIO position twice and endured the pain of being passed over twice. Now, a few years later, he's sleeping better. "I wanted the job then, but I've realized I'm actually much happier doing the work I'm doing. My sense of accomplishment is much greater," he says. "I may have less money and less visibility, but I have less frustration and I feel better. It's more fun. The CIO gets hassled constantly. Everyone's always asking him, 'Why don't you outsource that?' It's not a great position to be in."

Like GM's McNicholl and Deasy, many DIOs believe their position is the one to envy. While it is popular to the point of being a cliché to talk about "aligning the business with IT," Deasy believes GM's DIOs go further. "We see ourselves as being a catalyst for change in GM's global processes and businesses," he says. CIO

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*Lauren Gibbons Paul is a freelance writer in Belmont, Mass. She can be reached at* laurenpaul@sprintmail.com.

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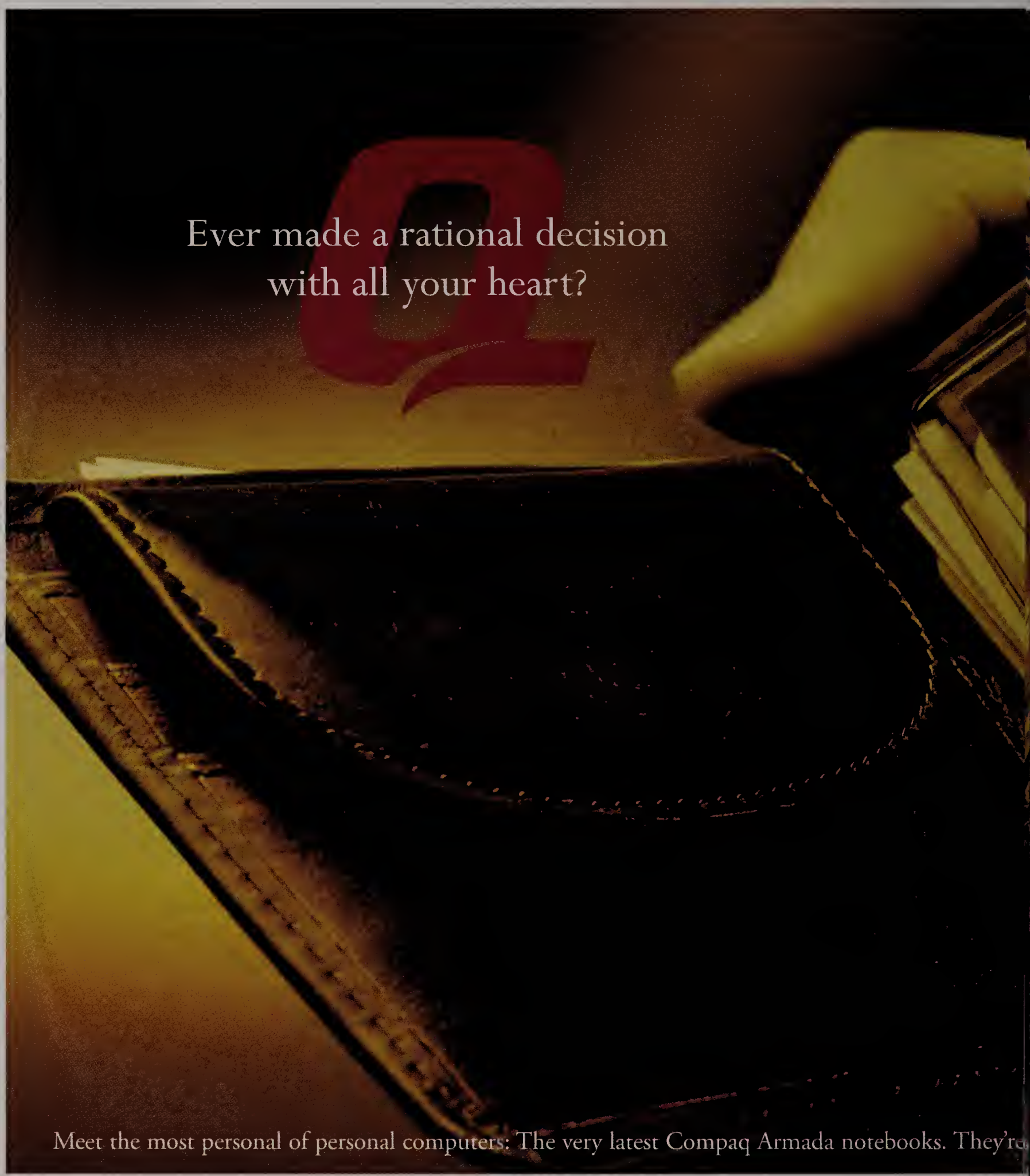


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## Reader ROI

YOUR NETWORK IS YOUR BUSINESS'S INFORmation lifeline to the world. But are your network managers prepared to respond to network emergencies? How are their skills for trouble-shooting in general? In a unique network trouble-shooting class *CIO* found, a simulated network is used to teach IS professionals

- How to spot a disaster in the making
- The methodology of network trouble-shooting
- The importance of teamwork and communication in emergencies

# Crash and Learn

BY TOM FIELD

*A simulated network proves a perfect training ground to teach IS professionals how to respond to real-life crises*

ILLUSTRATIONS BY JACK GALLAGHER

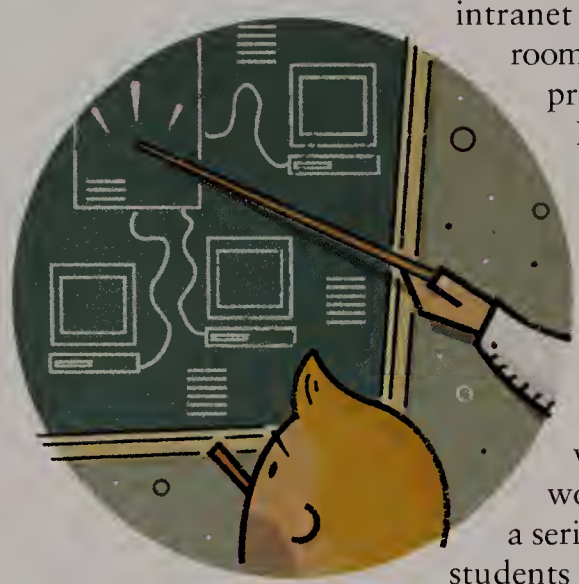
IT'S THE LAST PHONE CALL YOU WANT TO GET: A disgruntled ex-employee was caught sneaking out of your company's network operations center. No one knows exactly what damage was done, but now the network is running haywire. Traffic is twice what it should be. The servers are so overloaded with bogus messages that some users are completely shut out of the network. If this system isn't fixed fast, business could grind to a costly halt. One of your staffers tried to find the bug, but—talk about bad timing—his pregnant wife just went into labor. Now what?

Not a hoax, not a dream, not an imaginary tale. The above scenario is a simulated disaster—a practical exam, really—thrust upon IS professionals at the end of a recent "Trouble-shooting TCP/IP Networks" class conducted by the American Research Group Inc. (ARG), a Cary, N.C.-based IT training vendor. The problem is real—a hacker has unleashed a nasty bug—but the drama is played out not on a real company's information systems, but on a faux network rigged together in a hotel conference room in Schaumburg, Ill. The trouble-shooters are 18 network professionals completing the two-day course, and the hacker—no ex-IS employee gone postal—is instructor Rick Gallaher, an engineer and educator with 26 years of networking and telecommunications experience. "By the way," Gallaher warns as he sets the scene, "no class has ever found this bug."

The clock starts; the trouble-shooters-in-training have one hour to solve the puzzle. For the network-savvy students who pride themselves on their innate abilities to sniff out problems, the exercise is a fun challenge. But for those rookies tapping into new skills, this is a real test. Gallaher, an imposing man with a soft demeanor, sits behind his Looney Toons tie and smiles; he's been here before. He knows that no matter what size company these students come from, no matter how technically proficient they are, they need more than just tools and methodologies to shoot this trouble. They need each other. Whether they reach this realization before time expires—that's the true test.

## The Training

This isn't a class for CIOs, but it's one that CIOs should be aware of for their IT staffs. When the "Now what?" comes, the answer should be to send an IT professional who understands the ins and outs—technical and emotional—of trouble-shooting. More than just another expensive training session, the class is remarkable for the way the skills are taught. Students don't just sit through two days of lectures and readings, take a certification exam and then go back to work and promptly forget half of what they learned. Here the students still earn their valued certificates, but the lectures are minimal and the reading is supplementary. The real teaching is done via a live intranet network set up in the classroom to give students the chance to practice what's been preached. It's on this simulated intranet—complete with two servers (one running Windows NT 4.0, the other Unix), a Cisco router, up to 7 hubs and 12 PCs—that students get hands-on experience with the tools that help prevent, detect and eradicate network errors. By participating in a series of network disaster drills, students develop practical skills that they retain and can apply back at their jobs. And if they fail to solve the problems—or if they make them worse—well, thank God it's a fake network. You wouldn't want network professionals trying these trouble-shooting tricks for the first time at home.



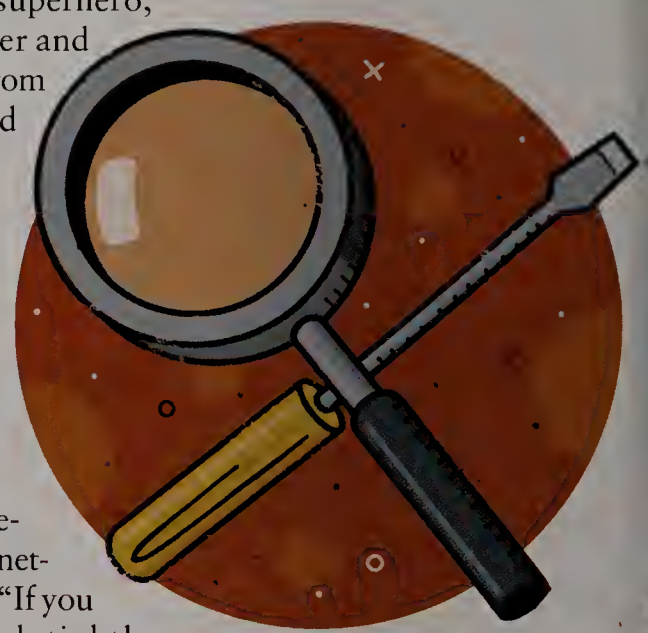
Know this, too: This is training that network professionals want. Networking skills are among the toughest to find in the competitive IS marketplace, and knowledge of the TCP/IP communications protocol, the lingua franca of the Internet, may be the hottest of the hot skills. Since April 1997, ARG has offered its trouble-shooting course anywhere from two to six times a month to groups of 20 or more students throughout the United States. (Earlier this year the course was introduced to the Pacific Rim countries and Europe.) Of the 18 individuals who signed up for this session, easily a third registered of their own volition just to improve their personal skills cachet. The unspoken message here is that if CIOs won't provide this training, then employees will go out and get it themselves—or go to work for a company that will give them access to these skills.

These students represent a range of enterprises, and their reasons for taking the class are just as diverse. Christine Teno, for example, is a network technical analyst at Grubb & Ellis Co., a global real estate firm based in Northbrook, Ill. Experienced with other protocols, she simply needs more hands-on experience with TCP/IP. David Spivey, the director of network services at On-Line Financial Services Inc. in Oak Brook, Ill., worries that his company's network trouble-shooting is done mostly on the fly; he needs to learn more about tools and methodologies. Evan Bounous, a network specialist from U.S. Central Credit Union in Kansas City, Kan., doesn't work with TCP/IP at all currently, but he wants the expertise.

And although each of these students has to take off at least two days from work to attend the class, clearly this is no vacation. There is a textbook to read and lectures to hear, but the bulk of the session will be devoted to dealing with simulated disasters. "Breaks are contingent upon how fast you trouble-shoot the network," Gallaher says. " [The time] you leave at night is contingent upon how fast you trouble-shoot the network. Sound like you're back at work? That's the idea."

## The Tools and Tricks

Underlying the trouble-shooting curricula are some basic concepts that apply to networking or crashing applications or anything else: Pretend it's a fire drill and stay calm. In this instance, Gallaher describes two types of trouble-shooters. First is the superhero, who rushes into danger and saves innocent users from the ravages of a downed network. And then there's...hmm, how does one say this nicely? You know how in parades, when the horses and elephants march by, they're followed by a grim-faced man with a shovel? This guy represents the other type of network trouble-shooter. "If you control your network tightly, you're the superhero," Gallaher says. "But if you let people do what they want on the network and then just clean up after them, you're the guy behind the horses and elephants." The difference between the two archetypes is methodology: The superhero has one, while the shovel-wielder wings it. The superhero methodology boils down to seven basic steps that should be taped on the wall of every IS shop:



**Define the problem.** Don't leap to conclusions—or rely solely on a user's observations—about a perceived net-

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# How Many Users Does It Take to Screw Up a Network?

GET A BUNCH OF NETWORK PROFESSIONALS TOGETHER AND what do they talk about? Users. Dumb users. At one point during the "Trouble-shooting TCP/IP Networks" class, students and instructor alike sit back to trade stories about dumb users.

Linda (not her real name), a network analyst at a major national insurance firm, tells about the company president who expects—and gets—a new PC every time his current machine crashes.

Then there's the senior executive—and more than one network professional can lay claim to one of these—who rousts network personnel out of bed at midnight because he has trouble dialing up his Internet investment sites. He thinks it's a network problem.

In his role as administrator of a hospital network, class instructor Rick Gallaher says he once got a call from the operating room during surgery. "The network is down!" the medical staffer said. Gallaher rushed to the OR and quickly diagnosed the problem on one of the PCs: It wasn't turned on. Gallaher laughs, and the students nod knowingly. They've been there.

Funny stories all of them, but beneath is a truism: Users can be a trouble-shooter's best friend. They rarely know what's wrong, and they hardly ever can explain why, but users do know when their computers aren't working as they should. If trouble-shooters take time to listen to users and try to understand their problems, Gallaher says, then network problems sometimes can be much easier to diagnose and fix.

And, of course, taking time to tell users of the importance of power switches and electrical plugs can't hurt either.

*–T. Field*

work problem. Test for yourself.

**Gather facts.** Did the system ever work? What changed? Have any new devices or services been added to the network? These simple questions can help unravel complex answers.

**Consider the possibilities.** Think what could be wrong before you start pulling plugs and switching off servers. Use the process of elimination to sort through potential problems.

**Create an action plan.** This is especially key in a large organization where multiple people may be trouble-shooting a single network. Draft a detailed chart of procedures and assign individuals to specific tasks.

**Implement the plan.** After each step of the plan is complete, test to see if the original problem has been solved. This process helps isolate areas affected by the problem and shows you when you're honing in on a solution.

**Observe and document results.** Even if you haven't solved the original problem, by documenting the results of your plan you can identify and compile effective and ineffective trouble-shooting techniques.

Problem solved?

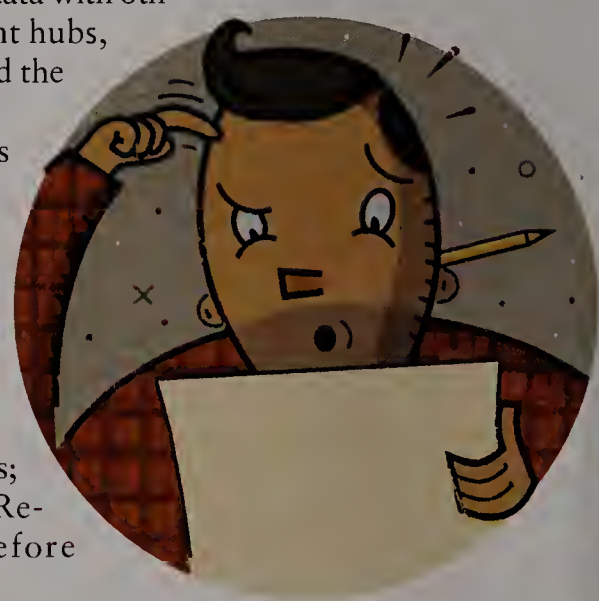
If yes, rejoice; if not, start over.

Before the tyro trouble-shooters are turned loose, Gallaher introduces them to the fundamentals of the trade. The tools are basic network management systems—LAN meters, protocol analyzers and software packages (for example, Cinco Network Inc.'s NetXray) that allow analysts to measure network activity. Corollary number one to the rules of network trouble-shooting is also fundamental: Don't get hung up on the tools. No network management device is worth its salt if it's not used within a strict trouble-shooting methodology.

## The Tests

Before he unleashes "The Big Bug," Gallaher tests the students with some simpler exercises. The first scenario: Users complain that they cannot communicate with anyone, anywhere. What's wrong?

The students pair off around the PCs, boot up NetXray, test their individual cables with LAN meters...and after half an hour have nothing to show for their efforts. The glitch was simple enough—Gallaher disconnected a wire from the router and switched one at the hub—but none of the pairs followed item number four from the trouble-shooting methodology; each tried to solve the problem solo. Had teams shared data with others working off different hubs, they would have isolated the real trouble in minutes.



Sobered, the students resolve to do better with the second exercise. The story line: Movers were in over the weekend, and they've completely reconfigured the network. Some users can communicate with others; some can't. The goal: Restore connectivity before

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Monday's productivity plummets.

This time, directed by Gallaher, three groups of six people form, assign roles and start tackling the problem by the book. Before long, after checking cable connections and network access at each workstation, the groups compare notes and easily isolate the problem: The movers (a.k.a. Gallaher) switched connections between workstations and their host hubs and servers. The solution is as simple as reconnecting a few wires.

Flush with this success, the students eagerly call for The Big Bug.

And they fail. Miserably.

Like every trouble-shooting class before them, these people ply the right tools and tricks—they even work well (mostly) in their six-person teams. But this is a larger network problem that requires teamwork from the entire class (in the real world, the teamwork of all IS might be required). Rather than pool common data and observations among the other teams, each group tries to be the superteam. Spivey and Bounous work together on one team that tries to find the source of the network traffic surge, but simultaneously another group is busy unplugging workstations all along the network. Teno's squad splits into two camps, each seemingly determined to manage the trouble-shooting process. Neither succeeds. Ultimately, rather than flying high as superheroes, each team ends up knee-deep in the stuff the parade guy shovels.

After an hour, Gallaher calls the exercise to a halt. Then he unmasks The Big Bug, which turns out to be a veritable ant: The hacker had switched cables between the two servers and used NetXray to generate a continuous spray of old network traffic. Period. Had the three teams coordinated their individual tasks, they would have quickly identified the duplicate traffic and isolated the culprit machine.

Yet, as Gallaher points out, there was no central control because that's the way life is in the workplace. Network disasters don't come packaged with coaches to prod trouble-shooters when they stray from their methodology. If there is any one lesson to take away from this class, it's this: Theories and tools are fine, but real trouble-shooting requires fidelity to process and to leadership.

And if the students were grateful for any one thing, it's that they learned this lesson in a mock disaster, not in a real crisis that could have cost them far more than hurt pride.

## Lessons Learned

Within a month of taking the class, the freshly certified trouble-shooters say they have already applied their new skills. Teno not only has the TCP/IP knowledge she sought, but she also finds herself sharing the knowledge with her organization's other analysts, who form the first line of response to network emergencies. "I used to jump right in and try a variety of trouble-shooting [methods]," Teno says. "I now question [the analysts], asking them if they tried this or that and what were the results when they did. This teaches them to [stop and] think as well as be more proactive."

Spivey also imparts the trouble-shooting methodology to his staff. "Often, problems [in our network] exist that we do not have the time to investigate because we are a 24/7 shop; we just put out the fire and continue," Spivey says. "The methods illustrated and demonstrated in class help in formulating a plan of attack in the real networking world. Also, since I am the director here, if the problem has not been solved within a certain time period, I can follow the method from class and narrow the problem down to where the engineers have not followed through. Lately, [problems] have been with the documentation portion of the method."

For Bounous, the payoff is twofold: the certification, which he feels makes him more valuable in the IS field, and the network tools, which he hopes to apply to other situations. "I don't know that I'll utilize most of what I learned in the real world, at least in my current job," Bounous says. "[But] I still enjoyed the class and would go to more like it in a heartbeat."

Students who took earlier courses report even greater impact back at the workplace. Joan Vehock, a network tools administrator at Lucent Technologies Inc. in St. Petersburg, Fla., took the trouble-shooting class this past spring and, at the time, thought that she'd have no quick opportunity to ply the skills. Yet almost immediately after returning to work she received some flawed network architecture specifications from a new corporate customer. Vehock was able to spot the problem (the network addressing was botched) for the technicians who ultimately fixed it. Her efforts saved time and money for both Lucent and the customer. "I would not have been able to pick out that problem if I'd not gone through the class," she says. Since then, Lucent has designated this trouble-shooting class as its training benchmark within Vehock's organization, and the TCP/IP analyst certification is being used as a selling point with prospective customers.

Vehock's and the other students' experiences form a good testimonial for simulated disaster training. Some executives undoubtedly question the merit of paying real money for network professionals to learn trouble-shooting on a virtual network. But here's a question for the executives: Can you afford to have these lessons learned by trial and error on your network? And remember, your people don't get just tools and techniques for the money; they get lessons in teamwork and leadership—qualities that befit not just today's network professionals, but tomorrow's CIOs. Seems like a small investment for the yield. CIO

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*Senior Writer Tom Field can be reached at* tfield@cio.com.

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BOOK EXCERPT:
INFORMATION RULES

# Lock'em up!

*What you should know about customer loyalty and the competitive concept of lock-in*

BY CARL SHAPIRO AND HAL R. VARIAN

CAPTURING AND KEEPING CUSTOMERS, known as lock-in, is increasingly becoming the competitive advantage weapon of choice for "smart" (that is, information savvy) companies. The customer loyalty program is gaining ground on product and price in its importance to success, and in the next millennium companies will escalate the battle to lure away and lock in each other's best customers. CIOs in every industry and every size company need to understand the concepts of customer lock-in and the loyalty program because information is the key that unlocks the power of both. In the excerpt below, from the new book *Information Rules: A Strategic Guide to the Network Economy*, authors Carl Shapiro and Hal Varian demystify lock-in and discuss loyalty programs and their variations.

BOOK PHOTO BY VITO ALUIA

**Lock-in is inherently** a dynamic concept, growing out of investments made and needs realized, at different points in time. We have developed a diagram to help you think dynamically about lock-in. We call this the lock-in cycle (see Page 74). The easiest place to hop onto the lock-in cycle is at the brand selection point—that is, when the customer chooses a new brand. Brand choice could mean purchasing a new multimillion-dollar switch, buying a video disk player, purchasing a new software program or signing up for a new frequent-flier program. The first time a specific customer picks a brand, that customer will have no preference for any one brand based on lock-in.

You are not born "locked in"; you get locked in only by virtue of choices you make. The next time around the cycle, the playing field will not be so level, however. Brand selection is followed by the sampling phase, during which the customer actively

*Reprinted by permission of Harvard Business School Press. Excerpt of* Information Rules: A Strategic Guide to the Network Economy. *By Carl Shapiro and Hal R. Varian. Copyright 1998. All rights reserved ($29.95; contact HBSP at 888 500-1016).*

uses the new brand and takes advantage of whatever inducements were made to give it a try. One of the dangers of offering powerful sweeteners to attract new customers is that they will take the free sample but never turn into revenue-paying customers. Some book clubs take this risk by offering eight books for a dollar; others require new members to buy a minimum number of books at regular prices. Extending introductory offers to new customers is especially tempting for information providers because of the low marginal cost of information. This is all the more so with a CD that costs less than a dollar to produce, in comparison with printed material that could cost $5 or more to produce.

Customers who do more than sample move into the entrenchment phase. This is when the consumer really gets used to the new brand, develops a preference for that brand over others and perhaps becomes locked in to that brand by making complementary investments. Usually, the supplier tries to drag out this phase and delay active consideration of other brands, hoping that the customers' switching costs will go up. The entrenchment phase culminates in lock-in when the switching costs become prohibitively expensive.

We return to the brand selection point when the customer either switches brands or actively considers alternative brands without selecting them. Of course, circumstances will have changed in comparison with his last time around the cycle. Certainly, the customer's switching costs are higher than they were the first time around. For specialized products, some alternative suppliers may have dropped out in the interim or lost capabilities. On the other hand, new technologies can emerge.

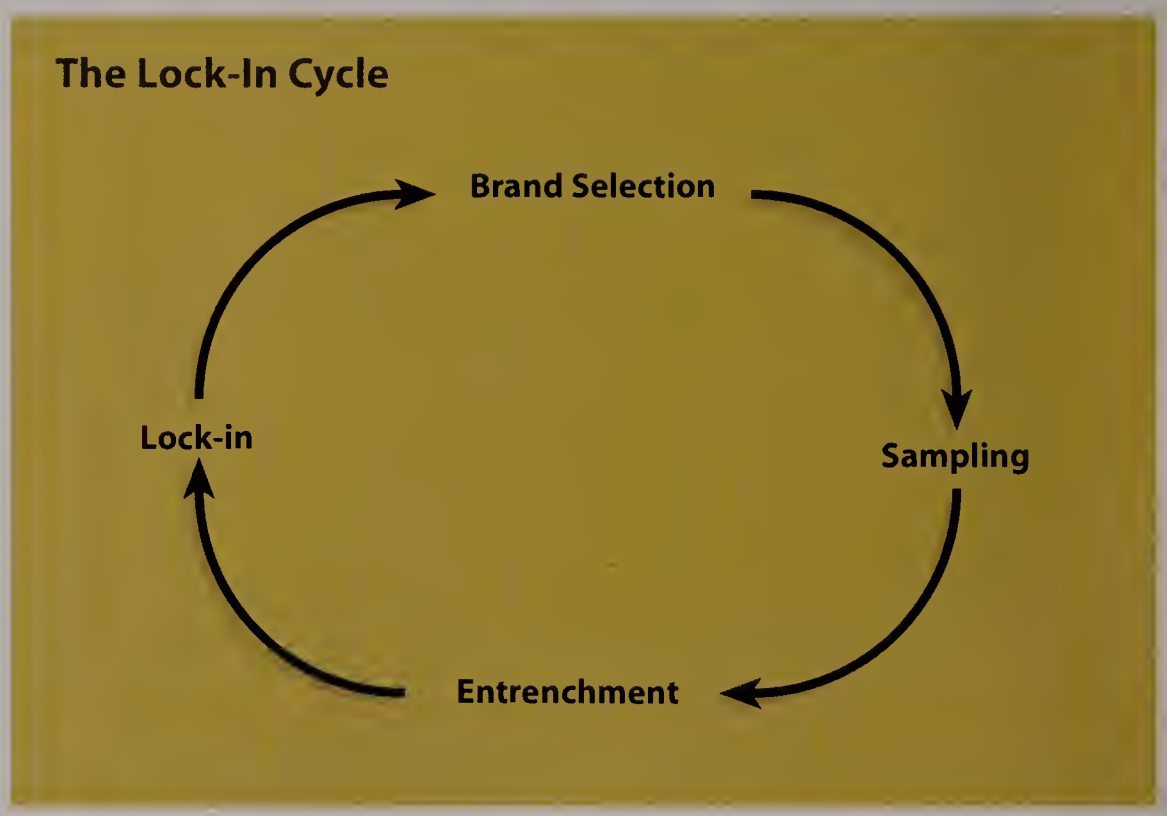
The most basic principle in understanding and dealing with lock-in is to anticipate the entire cycle from the beginning. In fact, you need to go beyond any one trip around the circle and anticipate multiple cycles into the future in forming your strategy from the outset. Valuing your installed base is part of looking ahead: By figuring out how much customers will be worth to you in the future (next time around the cycle), you can decide how much to invest in them now (by inducing them to take the next step and enter the sample phase, for example). This is especially true if switching costs are rising over time (as with information storage and brand-specific training) rather than falling over time (as with durable equipment that depreciates and will be replaced by new and superior models).

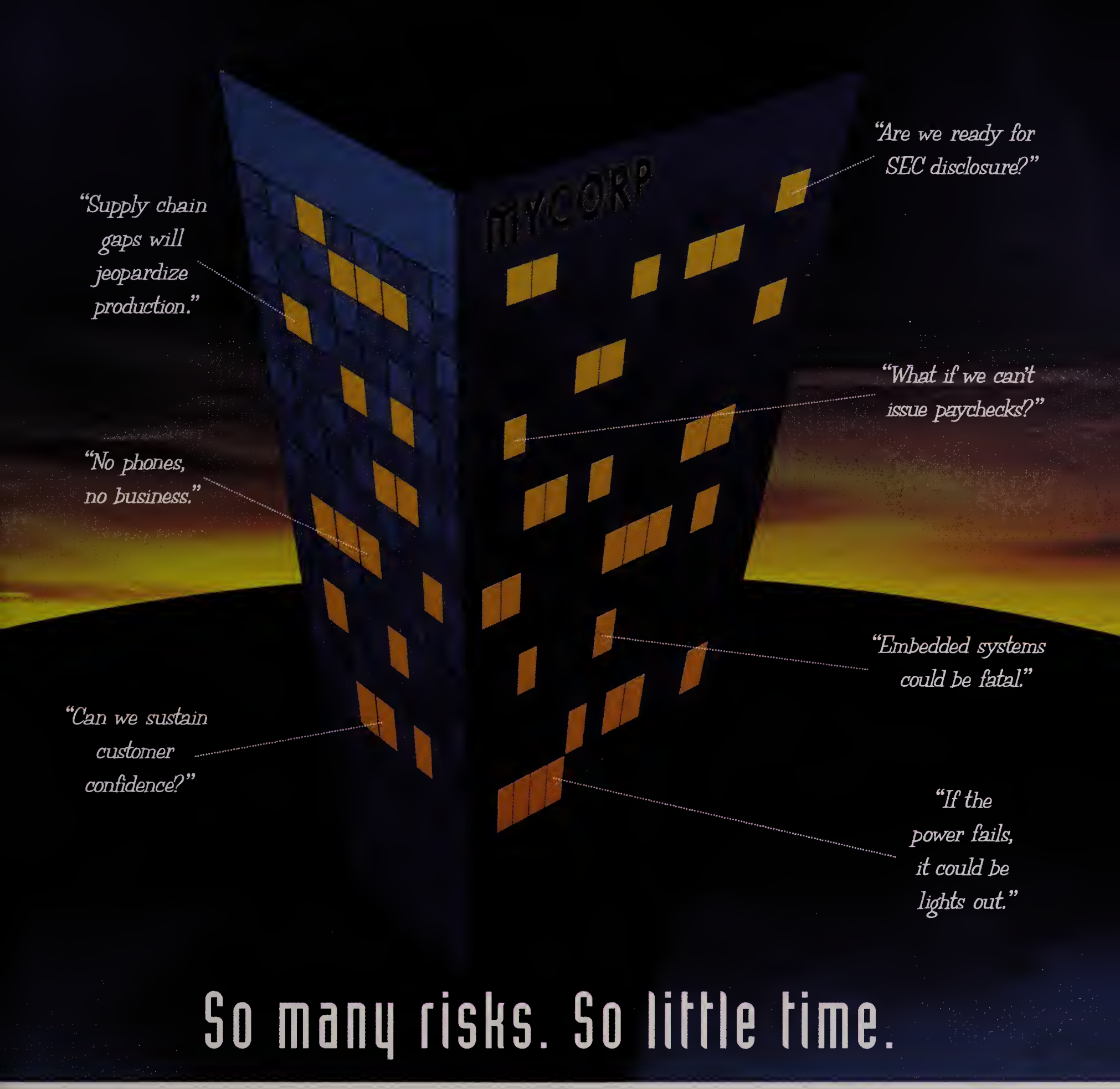
**The key to loyalty programs is that the reward for past loyalty must be available only to customers who remain loyal.**

### Entrenchment by Design

You can influence the magnitude of your customers' switching costs in a number of ways. One of the most information-intensive methods is to offer customers more value-added informational services. The pharmaceutical drug wholesaling business illustrates this point nicely. Traditionally, this business has entailed ordering pharmaceutical drugs from manufacturers, warehousing them and delivering them to customers such as drugstores and hospitals. The role of information systems and services in this industry has grown markedly in the last decade. The industry leaders, McKesson Corp., Cardinal Health, Bergen Brunswig Corp. and AmeriSource Corp., now distinguish themselves by offering sophisticated reporting services to large, national customers. To further entrench these customers, the large wholesalers have developed their own proprietary automated dispensing and reporting systems along with consulting services to deepen their relationships with clients. Value-added information services such as these are excellent lock-in methods, but the most common entrenchment tool is the customer loyalty program. The most popular and well known of these are the airlines' frequent-flier offerings.

Recently, hotels have followed suit with frequent-guest programs. Even local retailers use this tactic, giving one unit for free after 10 purchases. For example, our local film store will develop one roll of film for free after you have paid for 10 rolls. The nearby Mexican restaurant does the same with burritos, if you remember to bring along your card and have it punched. Loyalty



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programs create switching costs in two ways. First, you may forfeit certain credits if you stop buying from your regular supplier. If you have 15,000 miles in your airline account, and it takes 25,000 miles to get a free ticket, the 15,000 miles will be lost if you fail to fly another 10,000 miles before they expire. Second, and more important, are benefits based on cumulative usage, such as double miles or preferential service for members who fly more than 50,000 miles a year. These benefits become part of the total switching costs: Either the customer loses them (a customer switching cost) or the new carrier matches them (a supplier switching cost). As online commerce explodes, more companies will adopt loyalty programs, giving preferential treatment to customers based on their historical purchases precisely to create such switching costs.

The variations on these discount programs are virtually endless. You can offer your customers a discount for buying exclusively from you or for committing to a certain minimum order size. You can offer discounts for customers who buy more than they did last year. You can utilize volume discounts to encourage customers to keep buying from you rather than sampling other suppliers. Or, to attract new customers, you can offer introductory discounts as a way of helping defray their costs of switching to you from a rival. Perhaps the ultimate weapon here is to base the offer you make to a prospective new customer on information about that customer's status in your rival's loyalty program. For example, an airline will often offer "gold status" to someone who holds gold status on a competing airline in hopes of inducing them to switch carriers.

Loyalty programs will become far easier to administer as companies keep more information about their customers' historical purchasing patterns. Already, many retailers collect detailed information on individual customers' buying patterns. These methods require tracking individual customer purchases over time, establishing accounts for each customer that record purchases and maintaining a balance of some credits associated with frequent buying. As information technology continues to advance, this information processing will become less expensive, and more and more companies, including smaller retailers, will find customer tracking to be cost-effective.

### Preferential Treatment

The key to loyalty programs is that the reward for past loyalty must be available only to customers who remain loyal. Usually, this is done in two ways, each of which involves ongoing special treatment of customers who have accumulated substantial usage in the past. First, those customers may be given preferential treatment; this is the essence of United Airlines' Mileage Plus Premier program, whereby very frequent fliers are given preferential seating, chances to upgrade to first or business class, a special telephone number for service and so on. Second, historically heavy users are given bonus credits when they buy more goods or services; with United Airlines, this takes the form of double or triple miles for those who travel heavily on United. In the end, all these methods are forms of volume discounts: favorable terms for incremental purchases to customers who are heavy users on a cumulative basis.

**Artificial loyalty programs have the prospect of converting more and more conventional markets into lock-in markets.**

In an earlier era numerous retailers banded together to offer cumulative discounts: That was the essence of the Green Stamps system, whereby customers would accumulate stamps issued by many vendors and then trade in books of stamps to earn prizes. In today's economy, smaller vendors will again find it attractive to link arms with companies selling noncompeting products to offer cumulative discounts. We doubt your customers will be using stamps. They will likely do more clicking than licking, accessing online reports of their cumulative purchases from you and other companies with which you are affiliated.

Smaller and smaller businesses will find it worthwhile to set up their own loyalty programs as the information necessary to operate these programs becomes more accurate and more easily available.

These artificial loyalty programs have the prospect of converting more and more conventional markets into lock-in markets, as consumers find themselves bearing significant switching costs in the form of foregone frequent-purchaser benefits when they change brands. For the same reasons, consumer "loyalty," as measured by the tendency of consumers to frequent one or a few suppliers rather than many, is likely to grow. Whether the industry is clothing retailing (traditional catalog or online), hotels or long-distance telephone service, the companies that can structure their charges to attract and retain the lucrative heavy users will edge out their rivals, in much the same way that American Airlines Inc. gained an edge by introducing the first frequent-flier program back in 1981.

Competition is likely to take the form of sophisticated information systems and targeted promotional activities as much as traditional product design and pricing. CIO

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*Carl Shapiro is professor of business strategy at the University of California at Berkeley's Haas School of Business and holds a joint appointment at the university's department of economics. Hal R. Varian is dean of the School of Information Management and Systems at the University of California at Berkeley, with joint appointments at the university's Haas School of Business and department of economics. They can be reached at* www.inforules.com.

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# Emerging Technology

THE STATE OF THE ART, NEW PRODUCTS AND STAYING AHEAD OF THE CURVE

*Edited by Howard Baldwin*

## Turbulence for Telephones

*Be prepared for some trade-offs when it comes to IP telephony*

BY DAN SWEENEY

IMAGINE AN OFFICE WITHOUT TELEphones, an office where the familiar desk set in all its permutations has vanished, replaced by multimedia PCs running "Net phones" or "soft phones"—software programs that enable the PC to initiate and receive telephone calls. That would sure simplify your telecom architecture, wouldn't it?

Imagine simpler teleconferencing. Using an internal IP network, which by its basic protocol lends itself to multicasting, you can easily get a couple of dozen people in a phone conference. Imagine a call center where customers visit your Web site, call up the information they want and then click on an icon that immediately connects them to a service rep who can access relevant URLs and customer files. You can offer these services in places where toll-free numbers aren't even available.

This is the world that IP telephony vendors are promising. Companies such as NetSpeak Corp. in Boca Raton, Fla., Inter-Tel Inc. in Chandler, Ariz., and Vienna Systems Corp. in Kanata, Ontario, are among as many as 30 vendors of software and hardware playing in the IP telephony marketplace. If you don't need such highly advanced calling features as outlined above, companies such as Micom Communications Corp. in Simi Valley, Calif., and VocalTec Communications Ltd. in Northvale, N.J., offer a more basic inducement to abandon the tried-and-true public switched telephone network: namely, cost savings on both long-distance service and network hardware purchases. According to executives in the latter group, recurring monthly long-distance charges decline sharply when IP voice is implemented in the enterprise, and, what's more, server-based systems enabling IP telephony are significantly less expensive than conventional PBXs.

If this all sounds too good to be true, in terms of reducing both the complexity of your telecommunications structure and the costs involved, in some ways it is. Although there are benefits to IP telephony, there are also some gotchas that prudent CIOs need to be aware of.

### What's an IP Call, Anyway?

IP telephony is, by strictest definition, any voice traffic adhering to the Internet protocol. It is not precisely the same thing as Internet telephony. An Internet phone call properly refers to a voice transmission over the public Internet where no predefined route is established nor any provisions made to ensure for consistency of voice quality; as a result, quality generally suffers. In contrast, an IP telephone call need only use the protocol to meet the definition. It doesn't have to go out over the Internet, and in enterprise settings it will generally proceed over an

IN THIS SECTION


Stretching Fiber
Scripting Tool
Environmental Software
Assessing Y2K
Customer Profiling


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intranet, that is, a private data link following the protocol.

An IP telephone call is inherently less expensive to complete than an ordinary circuit-switched phone call simply because the IP transmission utilizes network resources with much greater efficiency. Ordinary calls tie up an entire voice channel for the duration of the call, while IP voice transmissions intersperse the voice packets between other types of data. IP telephony systems vary in efficiency, but through compression they can get as much as eight times as many bits through the line as conventional phone service.

Benjamin Epstein, vice president of business development for France Telecom North America based in New York City, uses Micom's IP telephony system for corporate communications within his organization. He insists that the cost savings from IP telephony are more than theoretical, based on his experience (he did not divulge actual figures). "IP voice networks represent shared resources," maintains Epstein, "and, what's more, the equipment to run them is inherently cheaper than [telephone company] switches."

### Phones Versus PCs

To enter this brave new world, you needn't jettison your phones (after all, there are a lot more phones than PCs, and we need to talk to those who don't have PCs). An IP voice transmission may be initiated in either of two ways. It may be made directly from a multimedia PC using a sound card and a microphone, or it may be made from an ordinary telephone connected to a voice server, usually via a PBX in business settings.

IP telephony over ordinary phones represents a relatively recent development. Prior to 1996 all IP phone calls were done on PCs through the medium of chat sessions, and they required both parties to be logged on. The session was in no sense analogous to a conventional long-distance connection, and calls had to be scheduled beforehand.

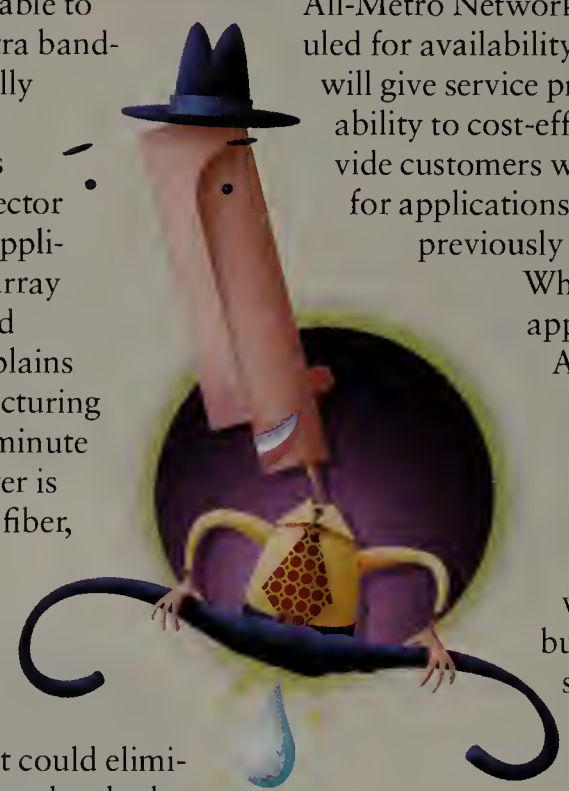
Obviously, such limitations were unacceptable in most business applications, hence the rise of IP telephony systems that incorporate rather than eliminate the desk set. Such systems allow calls to be made transparently, that is, exactly as if one were placing an ordinary phone call. These phone-based systems are currently dominant because they eliminate any learning curve associated with the new technology. PC-based systems are more flex-

## A New Process Gives Optical Cable Extra Bandwidth

SQUEEZING EXTRA BANDwidth out of optical fiber is a prime concern for telecommunications carriers as well as for CIOs at organizations that lease high-speed, high-capacity networks. Now Lucent Technologies Inc. says it has developed a new manufacturing process that allows it to pull 50 percent more usable wavelength out of fiber-optic cables.

### STRETCHING FIBER

Lucent was able to achieve the extra bandwidth by literally drying out the glass fiber, says Pat Emery, director of fiber-optic applications for Murray Hill, N.J.-based Lucent. He explains that in manufacturing fiber optics, a minute amount of water is retained in the fiber, making some light regions in the fiber spectrum unusable. Lucent found it could eliminate the water molecules by using a patented purifying process. Emery says the company's fiber, called AllWave, provides approximately 100 nanometers more bandwidth than conventional fiber. "For the first time, we are able to utilize virtually all the fiber spectrum, making the fiber capable of providing faster transmission speeds and greater network capacity."



Emery predicts that AllWave will allow high-speed digital services such as Internet traffic and video-on-demand to be transmitted more efficiently and affordably. Lucent will target the product, which is scheduled to become available before the end of the year, for metropolitan networks.

While AllWave is backward-compatible with current network hardware, Lucent also plans to combine the product with a mouthful called the WaveStar All-Metro OLS, a new multiterabit multiplexing device the company is developing to support the extra bandwidth that the new cable delivers. The combined product, dubbed All-Metro Network and scheduled for availability in fall 1999, will give service providers the ability to cost-effectively provide customers with the basics for applications that were previously unavailable.

What kind of applications? All-Metro Network will enable carriers to offer customers multichannel video distribution and simultaneous high-speed data streams, says Gerry Butters, president of Lucent's optical networking group. "With the tremendous growth in the Internet, there is an ever-growing need for even faster transmission speeds and greater network capacity," says Butters. "As end users around the world increasingly are able to obtain high-speed access through technologies such as DSL [digital subscriber loop] and cable modems, the need for multiterabit metropolitan systems will become increasingly important."

*–John Edwards*

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ible, however, in that they enable complex interactive applications where text and graphics share the same transmission path as voice. And while such applications are still foreign to many enterprises, they're likely to figure increasingly in Internet commerce with customers able to interact with sales agents while browsing a Web site.

PC-based systems also have the advantage of reach because they're not confined to private networks. Conversion of voice into packets takes place right in the PC, so they don't require a server at either end of the transmission path. Thus a voice-enabled PC can call anywhere in the world over the public Internet so long as the recipient of the call has the same IP telephony software.

In contrast, IP voice systems using standard telephones are generally confined to an enterprise. Users can make IP calls only to and from branch offices, normally over some sort of leased high-speed data connection. Recently, however, IP voice services have emerged that permit calls to individuals outside the enterprise while still avoiding normal long-distance tolls.

IP long-distance carriers such as Denver-based Qwest Communications International Inc. and Solon, Ohio-based AceTel Inc. provide such services, taking the place of a traditional long-distance carrier. When such services are utilized, the enterprise need not buy new equipment but can continue to employ the existing telephone system. The carrier provides the gateway connections to the local telephone system, and the fact that the phone call is converted into an IP packet shouldn't be apparent at either end of the line.

So far, however, the business community hasn't embraced IP long distance. No carrier has been in operation more than a few months, which is reason enough to make most IS folks hesitant. Moreover, no carrier offers truly universal service: Some offer coverage only in the United States; some offer international calling; a few offer both; but none provides global coverage. To do that, an IP carrier would have to install gateways everywhere—in other words, piece together an infrastructure that parallels that of the established long-distance carriers. And because most IP carriers are startups, they lack the resources to approach such universal coverage.

Furthermore, IP long-distance service charges aren't necessarily highly competitive—at least not yet. Companies tend to price the new service only slightly below the prevailing rates of major carriers despite the fact that current law exempts packet data from long-distance tariffs, which seemingly confers a significant cost advantage on IP carriers. Unfortunately, some in the IP telephony industry feel that any cost advantage IP has may not hold for long. "The big long-distance carriers are bringing their prices down to a few cents a minute," says Harvey Kaufman, executive vice president of NetSpeak. "Low-cost long-distance service will not make sense as a business for our industry unless we up its value with voice and data services."

## Applications That Communicate

THE INCREASING IMPORTANCE OF APPLICATION INTEGRATION has led to the commercialization of the scripting language known as **Tcl** (pronounced, delightfully enough, "tickle") via Scriptics Corp. in Palo Alto, Calif. Originally developed by former University of California professor John Ousterhout, who heads Scriptics, Tcl competes with the likes of JavaScript and Perl in the development world. According to the company, integration tasks can be done anywhere from 5 to 10 times as quickly with a scripting language as with a programming language like C or C++.

Tcl scripts can be embedded within applications and updated even after they've been deployed. As an interpreted (as opposed to compiled) language, Tcl lets programmers do quick iterations of scripts should business conditions shift. The commercial toolkit called TclPro began shipping in September for machines running Windows 95, Windows NT, Solaris for Sparc servers and HP-UX; pricing starts at $1,000 per developer. For more information, call 650 843-6900 or visit *www.scriptics.com*.

## It's Not Easy Being Green

WANDER DOWN TO YOUR FACILITIES MANAGER'S office some time and ask her how she keeps track of everything she needs to deal with. It's a long list: hazardous waste, environmental impact reports, occupational health and safety and more. To computerize these processes (frequently mandated by state or local governments), LFR Technologies LLC in Half Moon Bay, Calif., has created **GreenSuite**, a Java- and Web-based solution of seven modules designed to help companies plan, manage and track environmental, health and safety information.

The seven modules include product stewardship (hazardous product handling, storage and life-cycle management), incident tracking (occurrences of injuries, illnesses and spills) and prevention, personnel health and safety (scheduling and monitoring of hygiene and safety), hazardous materials and waste (arrival, distribution and disposal), environmental releases (inventory summaries and risk management), regulatory requirements (internal and external compliance issues) and facilities management (geographic and operations information, schedules and checklists). The software also comes with APIs that allow for easy integration with legacy and ERP data.

GreenSuite's underlying database is from Oracle Corp., and the modules run on any browser that's compatible with Netscape Navigator or Microsoft Internet Explorer. GreenSuite is sold as an integrated system, with pricing starting at $500,000, based on the number of servers and concurrent users. For more information, call 650 712-7470 or visit *www.greensuite.com*.

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# Emerging Technology

### Another Downside

The IP protocol was not designed for voice transmission and does not support it well in its native form. The reason is simple: Voice is intolerant of delays, and IP traffic patterns introduce delays unless special network management protocols are employed to prioritize voice. Such prioritization can be done only when the network is subject to end-to-end control, a condition that doesn't exist on the public Internet.

There are, however, some business users who find Internet voice quality acceptable. Curt Geiler, technical systems administrator for Universal Sewing Supply Inc., has established a public Internet link between the company's St. Louis headquarters and a regional office in Santo Domingo in the Dominican Republic and is satisfied with the results. "Our equipment paid for itself in a year. Initially, there were problems with voice quality, but the system performs better today, and the latency isn't bad." In Universal's case, however, a private wide area data network was not in place, nor was a managed network subscriber service available at the time.

A final limitation of IP voice is the use of speech compression. In order to maximize network efficiency, practically all IP telephony systems transmit abbreviated digital representations of the voice that in some cases discard over 90 percent of the data in the voice samples. While speech compression technology has made rapid advances, highly compressed speech still sounds somewhat unnatural, and the delays and losses inherent in IP networks exacerbate the problem. Nevertheless, similar compression techniques are commonly used in digital cellular systems and have proven acceptable to the mass of users. IP telephony companies are betting that land-line business users will prove similarly tolerant.

### One Network?

Despite the paucity of full deployments and established carriers, IP voice has one compelling argument in its favor. Many industry experts think its deployment is inevitable, and practically all major switch manufacturers are looking toward the day when the telephone switch will become in effect a packet router. Why? Because traditional telephone switches normally represent closed architectures that can't easily add functionality. Unlike voice routers and servers, they don't facilitate the sophisticated switching and rerouting functions required for advanced calling features. A network based on general computing engines is simply more flexible.

For the time being, IP telephony remains a nascent technology. "Voice over IP is still experimental so far as we're concerned," cautions France Telecom's Epstein. "It's applicable in special circumstances, but it's not for everyone." CIO

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*Dan Sweeney is a technology writer based in Burbank, Calif. He can be reached at* dswee34359@aol.com.

## Just Starting Y2K?

HERE'S A THOUGHT: MAYBE THERE SHOULD BE A support group for Y2K procrastinators. You know who you are. In any case, Ravel Software Inc. in San Jose, Calif., has announced availability of **Unravel 2000 for Cobol**, an analysis tool for code running on mainframes and minicomputers from Digital Equipment Corp., Hewlett-Packard Co., IBM Corp. and Unisys Corp. The Unravel software comes in two modules: an impact assessment tool and a compliance editor. The first module takes programmers through the process of assessment and analysis, automatically generating schedules that reveal how long the remediation process will take and how much it will cost. The second module reveals all potentially date-sensitive parts of the code and can generate test cost for debugging and audit purposes.

The tools are available for PCs running Microsoft Windows 95 or NT. They employ the same interface as Ravel's client/server Y2K tools. Unravel 2000 for Cobol's assessment module costs $4,995 per user, while the compliance editor costs $50,000 per user, or $150,000 for a five-seat license; the company does not charge by the number of lines of code. For more information, call Ravel Software at 408 955-1990 or visit *www.unravel.com*.

## Helping Partners with E-Commerce

YOU HAVE BUSINESS PROCESSES. YOUR SUPPLY CHAIN has business processes. Wouldn't it be great if they were the same process? EC Cubed Inc. in Wilton, Conn., has developed a group of application components called **ecWorks** specifically to help extend internal business processes out to e-commerce partners in a way that's easy to manage and update. The ecWorks suite consists of four components: ecProfiler (user authentication, authorization and profile management; $16,995); ecWorkRouter (e-commerce process definition and routing; $34,995); ecTradeMaker (business partner mediation and collaboration; $39,995); and ecAdvisor (user notification of business events; $11,995). Along with these components comes an administration application as well as objects and APIs for building transactions. These components are currently available.

Slated for release later this year are ecDataBuilder ($77,995) and ecMessenger ($64,995), integration components for linking business processes with legacy, EDI and ERP applications. Prices are for one license on a single-processor server (multiple-processor servers require multiple licenses); maintenance fees are 17 percent of the license fees.

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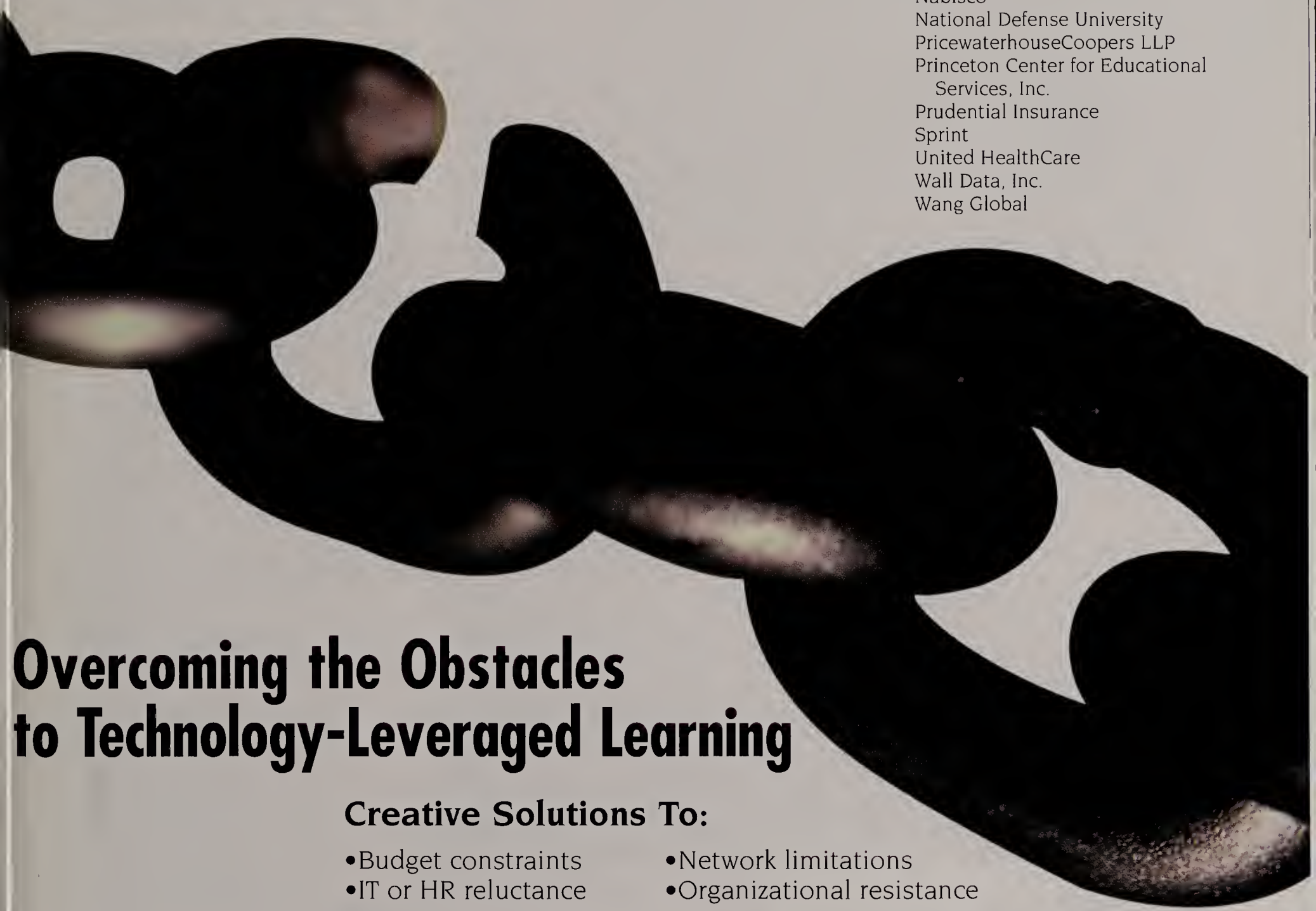

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# Ready, Set, Go Virtual

*Any and all business functions can now be outsourced—or will be soon*

BY STEVEN BELL

BUSINESSES ARE MOVING PAST the limits of their own perceived core competencies to become virtual businesses—stripped-down entities that with available technology perform nothing more than business functions that create "unique value." These companies outsource all business functions that are not capabilities unique to the company.

This evolution in commerce is the final dismantling of the vertical integration legacy of the Industrial Age, when the world's largest—and most successful—corporations sought to become self-supporting, mega-enterprises that could mine raw materials, transport them to factories, produce goods and sell them through wholly owned distribution networks. But since the early 1990s the focus on core competencies has had businesses outsourcing everything from building maintenance to transportation to offshore manufacturing. In operations areas such as logistics, order fulfillment and customer service, where a CIO may not ordinarily expect outsourcing, the effect on the business and the IT that supports it will be especially profound.

### Unique Value

Traditional companies are becoming virtual. Egghead Software, now Egghead.com, abandoned its brick-and-mortar retail stores to sell exclusively over the Internet. Computer wholesaler NECX, networking vendor Cisco Systems Inc. and industrial supplies distributor W.W. Grainger Inc. have extensive online sales efforts that are outgrowing their conventional sales channels. And Minute Maid subcontracted the entire production and distribution part of its business to work exclusively on developing and marketing juice products.

Some businesses are simply born virtual. Internet startups such as Autobytel.com Inc. and CDnow Inc. were created as virtual businesses, relying on partnerships to provide all but the unique value proposition to their customers. For example, CDnow doesn't own a warehouse and keeps no physical inventory—it has partnered with record distributor Valley Media, which fulfills and ships every order placed through CDnow. Likewise, Autobytel.com has no inventory of cars; instead, it supplies potential buyers with manufacturer

## Can You Take the Heat?

For each yes you give in this quiz, add another degree of readiness for your company to outsource business functions

1. Do product innovation and brand drive market share in your industry?
2. Is distribution not a core business function for your company?
3. Is your company experiencing rapid growth or global expansion?
4. Are internal resource constraints limiting new business opportunities?
5. Is management focused on streamlining, outsourcing or core competencies?

| Your Yes Quotient |
|---|
| 5 Sizzling |
| 3-4 Hot |
| 1-2 Lukewarm |

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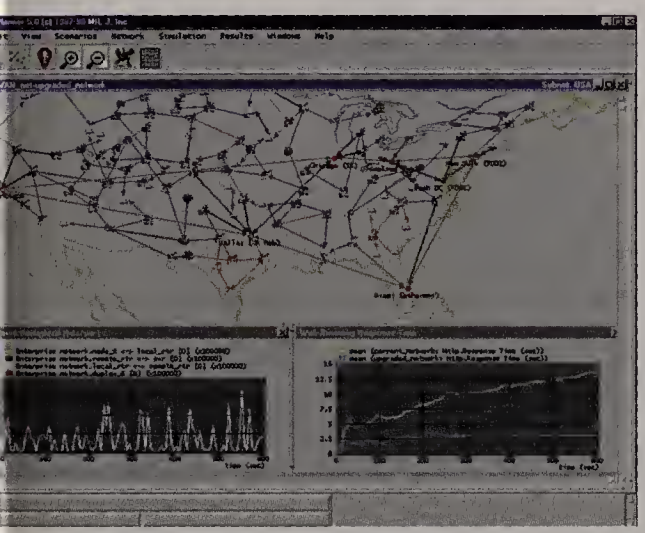

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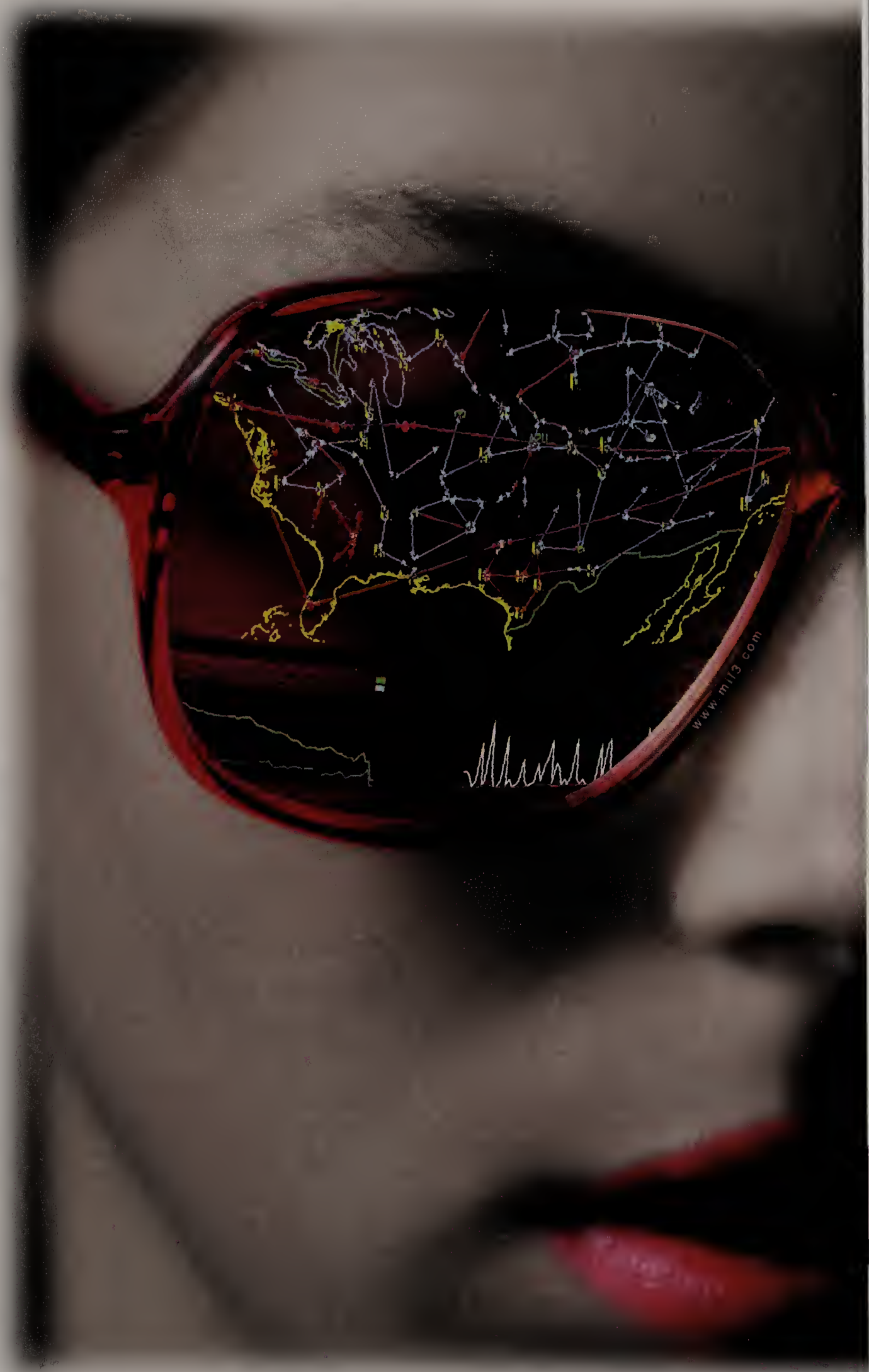


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Just what does a virtual business do to earn its profits? Three business functions remain as the unique value these companies can provide:

1. Create new ideas for lucrative products and services.

2. Position the product in the marketplace. This is both the development of brand image for the new product or service and the unique customer service capabilities offered online such as Cisco's online configurator, which checks all assembled equipment for compatibility before fulfilling an order.

3. Create a team of partner companies that together provide a new, unique offering.

Beyond unique value offerings, virtual businesses contract out remaining functions, including manufacturing, logistics, accounting and IT infrastructure. Most of this business model is not new, at least to some companies and their CIOs. What is new is the need for logistics outsourcing on a functionwide, global scale. Today many companies outsource their shipping, some outsource warehouse operations, and a few outsource customer support, repairs and returns or order fulfillment. But no one outsources all these functions to outside contractors on a global scale—yet (see "Functions and Systems," Page 90).

In fact, no current service providers can meet all these outsourcing needs—let alone do it globally. But Forrester Research Inc. expects a new breed of outsourcer, the virtual logistics outsourcer, to emerge during 1999. Third-party logistics providers such as Schneider National Inc., Penske Corp. and Skyway Freight Systems Inc., overnight delivery services such as Federal Express Corp., United Parcel Service of America Inc. and DHL International Ltd., and consortiums such as the Star Alliance already meet a portion of virtual logistics outsourcing needs in some parts of the world. Indeed, these companies are the front-runners in the race to offer complete global virtual logistics outsourcing.

**It's no longer just about scheduling trucks and packing warehouses. A virtual business needs more functions supported by its outsourcers.**

## Logistics Wishes

A company moving toward a virtual business model needs providers to operate global business functions for them. It's no longer just about scheduling trucks and packing warehouses. A virtual business needs more functions supported by its outsourcers, including:

- **Order taking.** Customers can place orders at either the virtual business Web site or by calling a toll-free number. Web orders are sent electronically to the logistics outsourcer for fulfillment; the logistics outsourcer's call center answers toll-free calls and submits orders.
- **Build-to-order, repairs and returns processing.** Outsourcers build products to order from components stored in their warehouses, or those of another outsourcer, to meet customers' specific needs. Requests for returns or repairs—whether transmitted via Web site or phone—are handled by a logistics outsourcer, who arranges for pickup, brings the product to its repair facility and redelivers the repaired unit to the customer.
- **Global supply chain infrastructure.** Virtual businesses can be supported by entire end-to-end supply chain systems that will be operated by virtual logistics outsourcers, similar to networks already in place at Federal Express or Emery Worldwide for moving packages. Partner businesses will tie into the outsourcers to support the virtual business through Internet connections.
- **Order fulfillment.** A logistics outsourcer will pass the order to its inventory-management and transportation systems for global delivery from the nearest outsourcer warehouse. All transportation and inventory will be managed for the virtual business by other outsourcers. Warehouse replenishment orders are sent daily to the contracted manufacturer on behalf of the virtual business.

## Virtual Outsourcing and IT

Whether a company outsources these four components piecemeal to a dozen providers or all at once to some future virtual logistics outsourcer, the implications for the IT infrastructure are considerable. When outsourcing a business function, a company has three IT options: It can outsource the business function while maintaining supporting IT applications in-house; it can outsource both the business function and the current supporting applications to be run by the outsourcer; or it can outsource the business function to an outsourcer that operates its own business-function IT applications.

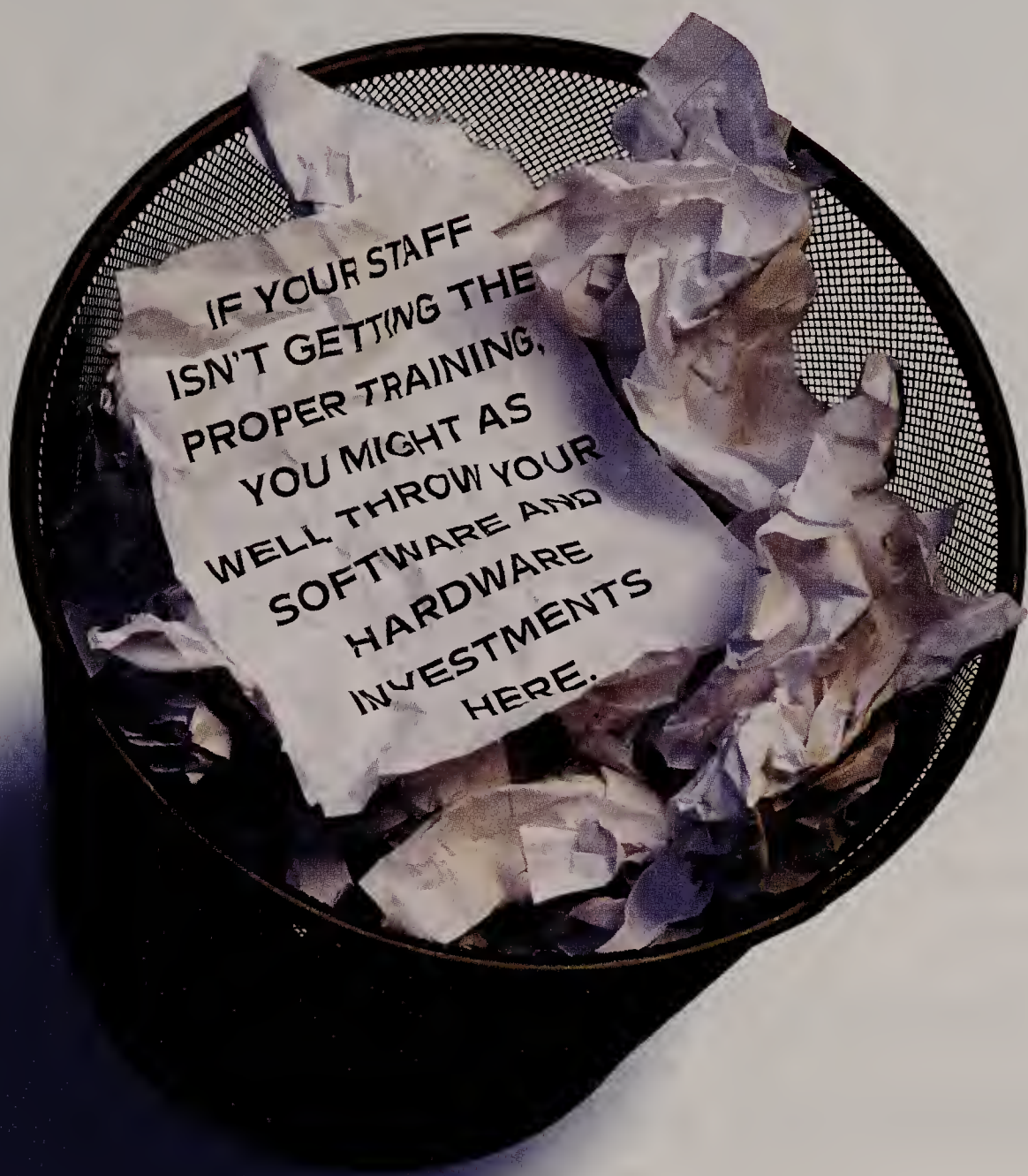
As a basic rule, the more general the business process to be outsourced, the easier it is to outsource supporting IT functions. A business with a large amount of customer specialization generally requires a more customized IT solution, so it should continue to be controlled by an internal IT organization rather than turned over to an outsourcer. For example, shipping goods and taking telephone orders are functions that lend themselves well to outsourcing, but specialized supporting applications and IT infrastructure for a business function that is very specific to a particular industry or company is not a good candidate for outsourcing.

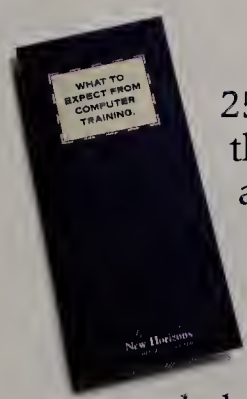
## Get IS Ready

A quick decision by senior management to outsource global operations support could have a devastating impact on an unprepared IT organization. Like the Boy Scouts, CIOs should "be prepared" to go virtual. CIOs can follow this three-step plan to stay a step ahead of any unexpected business function outsourcing.

**Determine likelihood of becoming a virtual business.** Complete the questionnaire in "Can You Take the Heat?" (see Page 86). If your business scores a 2 or higher, your company is a potential logistics outsourcing customer.

**Inventory IT operations.** For customer service, order processing, inventory management, transportation and returns and repairs, determine the current state of supporting IT infrastructure. Assess each

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system's design, operations and maintainability. Does the system design meet operational and business needs? Can the system generate the kinds of reports required to run and monitor the operation? Can it be easily maintained and enhanced as needed? Is running the current system in an operational environment easy and cost-effective?

**Lay out an IT contingency plan.** Determine the best IT strategy for each business function under the assumption that it will be outsourced. This may mean replacing the current IT systems with a best-of-breed solution owned and operated by the logistics outsourcer; outsourcing the business functions but keeping all current internal IT systems in-house to run them; or keeping the current systems but outsourcing the operation of both the function and the internal supporting IT to the logistics outsourcer.

**Armed with the necessary information to respond to any move toward becoming a virtual business, a CIO can immediately predict the move's IT consequences.**

Once armed with the necessary information to respond to any move toward becoming a virtual business, a CIO can immediately inform other business leaders of the move's IT consequences. But the information does more than just furnish IT with a solid contingency plan—it endows the CIO with knowledge on the state of business operations and current IT support levels. This can be used to justify further investment in upgrading IT infrastructure for business operations that are often overlooked. Best of all, an effective plan for converting to virtual business functions can offer a vision of a new, more efficient way to operate—as a virtual business. CIO

*Steven Bell, an analyst for business, trade and technology at Cambridge, Mass.-based Forrester Research, can be reached at* sbell@forrester.com.

# Functions and Systems

*Outsourcing a business function while keeping supporting applications in-house won't maximize the benefits*

**MANY FIRMS NOW CONSIDER OUTSOURCING a function and use new systems put in place by the outsourcer. So, for example, rather than giving over warehouse operations with an old legacy inventory system, the company elects to use a single vendor's warehouse and advanced warehouse management system for the physical management of goods and the IT function.**

**This strategy can provide significant near-term efficiency gains, but it also makes it difficult to switch outsourcers down the road.**

**Growth of U.S. contract logistics market**

| | 1992 | 1996 | 2000 |
|---|---|---|---|
| Market size (in billions) | $10 | $25 | $47 |
| Relevant services | 374 | 421 | 474 |
| Penetration rate | 2.7% | 6% | 10% |

SOURCE: CASS INFORMATION SYSTEMS INC.

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*Results of survey of 50 manufacturers. Multiple responses accepted.*

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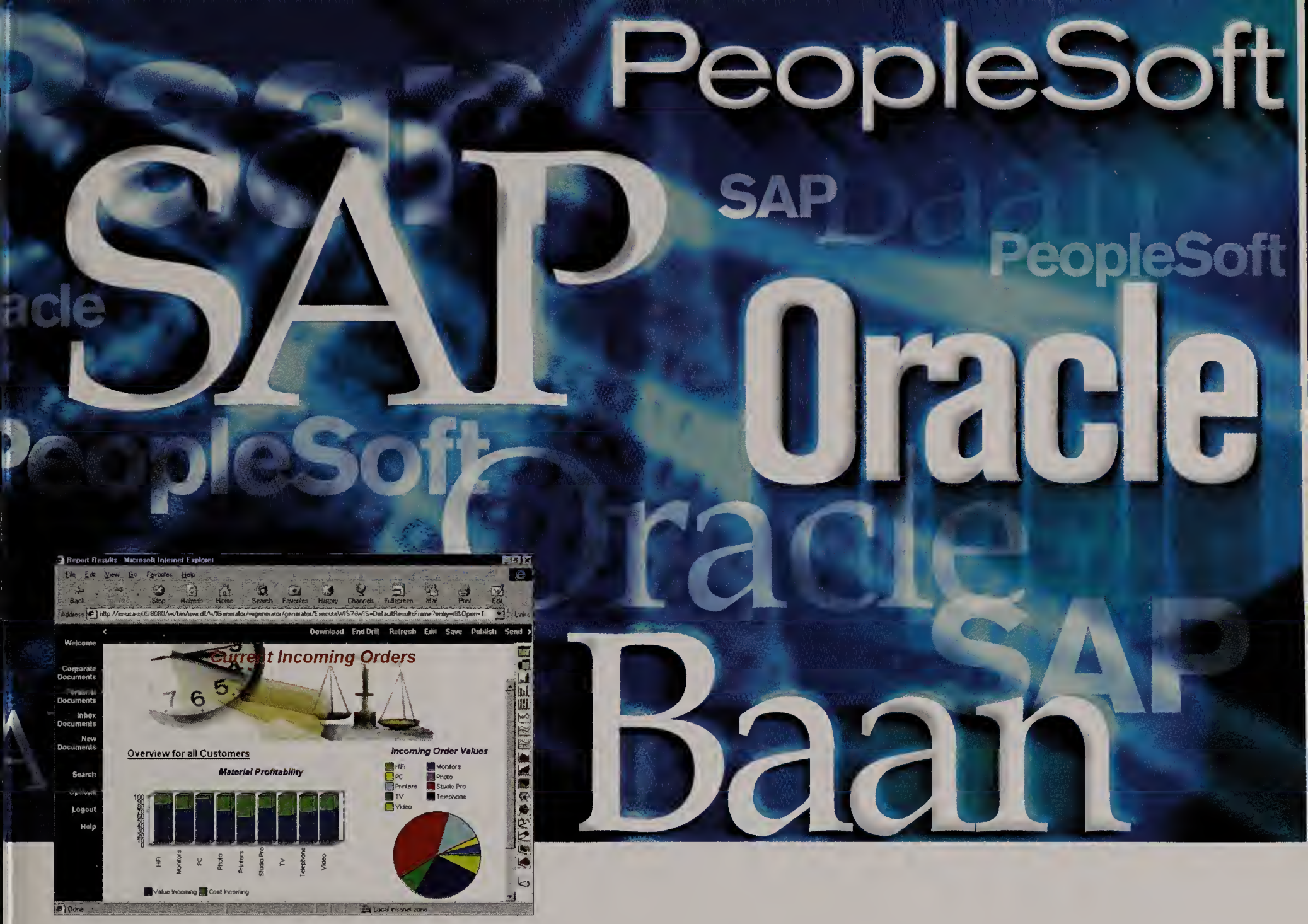
**Do you outsource your warehouse?**

*Results of survey of 50 manufacturers*

SOURCE: FORRESTER RESEARCH INC.




# What you put into your ERP system is your business.

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Whether you rely on SAP, Oracle, Baan, PeopleSoft, or other popular solutions, it's important to remember that to users, the data in your enterprise resource planning (ERP) system is only as good as the tool that accesses it.

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Today's service level agreements are distinguished by clear, simple language and a tight focus on the business. For the IS groups that use SLAs, the benefits can be substantial. This story features tips and advice, culled from the experiences of committed SLA users, to help clarify the process of defining, implementing and maintaining these contracts.

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CIOs struggle to attract, retain and retrain competent IT staff, develop basic tenets of IS security, recover from natural disasters and prepare for the most imposing IT deadline in history. Although risks associated with each of these situations have increased, the time to formulate contingency planning has shrunk. Business and IT executives must be prepared to ad hoc evaluate, prioritize, juggle or abandon each critical situation in a constant state of readiness and often with extreme prejudice. Will you be ready? *Contact* CIO *at 800 366-0246 or* www.cio.com/conferences.

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**Editorial, Advertising and Business Offices:** 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published in two sections, semimonthly; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. Periodicals postage paid at Framingham, MA, and at additional mailing offices.


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# Working Smart

MAXIMIZING THE PAYOFF FROM I.T.

## Solutia's Expense Reporting System

CONTROLLING ADMINISTRATIVE costs is crucial for Solutia Inc., which provides chemical, fiber and polymer products to the competitive consumer and commercial markets. In a company where more than 3,000 administrators, product managers and sales staff travel regularly, processing travel expense reports was an area Solutia targeted for cost reduction.

The St. Louis-based company realized in late 1995 that its travel expense report process needed an overhaul. Depending on where an employee worked, he or she tapped into one of 10 systems to record expenses and complete a report. The employee then sent receipts and the report to a manager who—after approving everything—forwarded the material to the accounting department, which then issued a reimbursement check. The only automation came at the front end, when employees entered their expenses into the system.

This approach was far too expensive. "We needed to reduce the cost per expense report by about 50 percent," says Elliot Grissom, Solutia's director of accounts payable, travel and financial systems. "We knew that we had to drive it down to one system, one process." And the system had to be automated so as to reduce the number of errors and streamline the entire process of filling out expense reports and generating reimbursement checks.

Solutia also recognized that simplifying its travel expense system would have the added benefit of reducing the amount of time that employees spent waiting for reimbursement checks. With sales staff scattered nationwide and most managers based in St. Louis, routing paperwork often took days. Plus, employees would no longer have to learn a new system each time they transferred from one department to another.

By spring 1996 Solutia defined key requirements for the new system. The list included client/server technology, electronic routing and the ability to run on NT servers and Windows clients. In addition, Solutia wanted to implement a system that could be easily configured to its changing needs. After choosing XMS travel expense software from Portable Software Corp. (now known as Concur Technologies Inc.) of Redmond, Wash., Solutia began a pilot project in late 1996 and launched its new system in early 1997.

Since then, efficiency has soared. Reports are now processed and submitted electronically to managers, with copies sent simultaneously to the accounting department. Employees send receipts directly to accounting, where they are scanned into document management software from FileNet Corp. of Costa Mesa, Calif. In turn, information from the scanned images is imported daily into XMS, where it is matched with the report. Without waiting for manager approval, the accounting staff reimburses the employee with a payment that's electronically deposited into her bank account. When the manager approves the report, the software automatically matches the approval with the report. If the report is rejected or questioned, the employee is notified via e-mail to submit more information. Solutia also uses XMS to audit travel expenses. Any reported expense that deviates from the corporate travel policy—such as the price paid for an airline ticket, for example—is automatically flagged for review by the accounting department.

The XMS package allows Solutia to integrate expense data received daily from American Express Co. (Employees use American Express corporate credit cards to charge travel expenses.) Solutia forwards the data to employees twice a week via e-mail messages so they can paste the information directly into an expense report instead of entering the information from receipts.

Solutia has come close to meeting its original goal of cutting costs by half. "We now have all processing done in St. Louis rather than 15 locations nationwide," says Grissom. "There are no paper expense reports or receipts that need to be stored. And there are no legacy systems that need to be converted for the year 2000."

In the future, Solutia plans to move its system to the corporate intranet in an effort to speed response times even further.

**Vital Statistics:**

- **Organization:** Solutia Inc., St. Louis
- **Application:** Travel expense reporting system
- **Technologies:** Concur Technologies Inc.'s XMS running on an NT server and Windows clients; document management software from FileNet Corp.
- **Scope:** More than 3,000 corporate staff, product managers and salespeople
- **Sponsor:** Elliot Grissom, director of accounts payable, travel and financial systems
- **Objective:** Consolidate multiple travel expense systems into one centralized system
- **Payoff:** Reduced costs, improved efficiency, eliminated storage requirements

*Louise Fickel, a freelance writer based in Yellow Springs, Ohio, can be reached at* RiceKid@ix.netcom.com.

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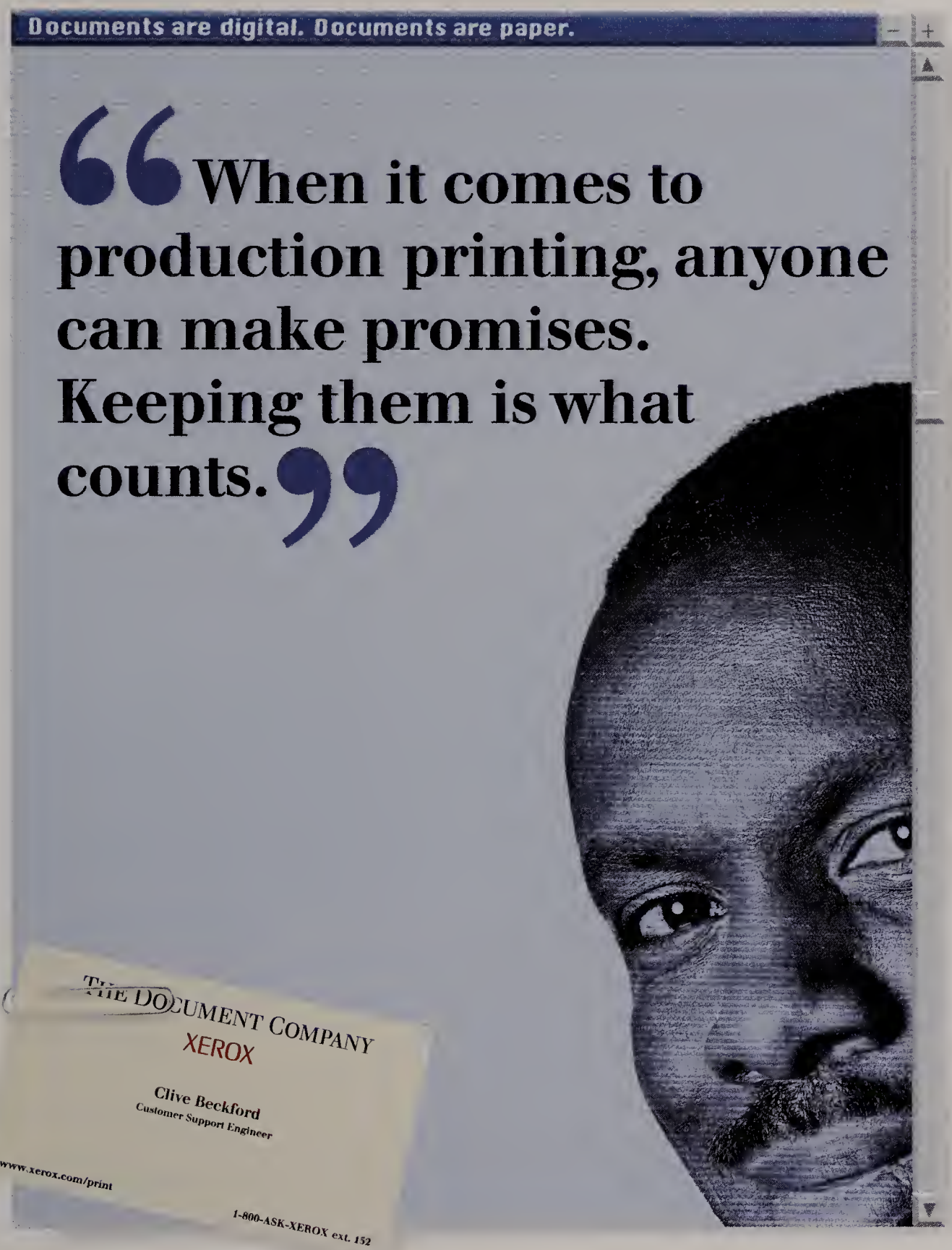


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